¶ An Introduction of Algorisme, to learne *to reckon with the Penne, or* with the Counters, in whole numbers or in broken. Newlie ouerséene and corrected.

Whereto is annexed, certaine *notable and pleasant* rules of false positions, not before *seene in our English* tongue.

By which all manner of difficill *Questions, may easely be dissolued* and assoyled.

(***)

Imprinted at London by *Iohn Charlewood*, dwelling in Barbican, at the signe of the halfe Eagle and the Key.

1581.

Ra: Roseville. Sept. 10 May 1610

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To the Reader.

THat Arte and feate (deare Reader) whom Vtilitie and Neceſſitie bothe doo commend: needeth greatlie of no other commendation. How profitable and neceſſary this feate of Algoriſme is, to all manner of perſons which haue reckonings or accounts, either to make, or els to receiue: needeth no declaration. Neither is this Arte onelye neceſſarie to thoſe, but alſo in manner, to all manner of Sciences & Artificies. For what craft is that but it ſometime dooth occupie, not onely one part of this feate, but all the partes. And forbecauſe that diuers rules in this booke, haue not beene in times paſt very commodiouſly expreſſed and ſet foorth, and many examples, mo then needed a great ſort coheaped together: therefore paines hath beene taken, bothe in the better and more clearer declaration and expreſſing of the ſayde rules, and alſo in the reſecting and cutting off diuers ſuperfluous and voyde

thinges, rather hinderaunce to the dilligent Reader, then furtherance. Furthermore, there is added the rules of falſe poſitions, the which how conuenient and profitable they be to the ready ſolucion of all harde and miſtie queſtions: when ye haue reade them then iudge. Now then ye ſhall vnderſtand, that in this Arte there are. vii. neceſſarie and diſtinct parts to be knowne: that is Numeration, Addition, Subtraction, Multiplication, Partition, Progreſſion, and Reduction. Of the which. vij. hereafter ſhalbe ſingularly entreated, of eche of them in their Chapters. But I aduertiſe you fyrſte to begin at the fyrſte part, and then ſucceſſiuely to the ſecond, and ſo the third, &c. learning euery part by it ſelfe exactly, as they be ſet foorth in this booke. For if you leape to the ſecond part before you haue perfectly the firſt, or to the third, before you haue ſeene the ſecond: you ſhall neuer proſper nor profit in this Arte.

Vale.

¶ The

¶ The fyrste part is of Numeration.

Numeration is a manner of expressing of numbers by certaine figures, which are called figures of Algorisme, the which be ten as in this example.

i. ii. iii. iiii. v. vi. vii. viii. ix.

1 2 3 4 5 6 7 8 9 0

Of the which nine be significatiue, the tēth called a cypher signifying nothing of it self, but onely set before the other significatiue figures, augmēteth their signification. In Numeration by this craft, ye must euermore beginne at the right side of the booke: and so towards the left side, as in this example.

k i h g f e d c b a

3 2 0 4 6 7 5 2 8 9

¶ This figure 9 vnder a, standeth in the first place, 8 vnder b, standeth in the second place, and so foorth to the ende, so 3 vnder k, standeth in the last place.

By these ten figures al manner of nũber possible to be excogitat, may clearly & plainly be expressed, which albeit, that of thẽ selfe they signifye but simple and little number, as ye see afore; yet according to ỳ diuersity of ỳ place they stãd in, diuersly doth their signification amount. Wherfore in Numeration ye must note two things, the figure significatiue, & the place it standeth in, for the significatiõ of ỳ figure, dependeth vpõ the number of ỳ place it stãdeth in. For example, this figure 8. standing alone, or in ỳ first place, signifieth but. viij. but if he stand in ỳ secõd place, as heer 80, he signifieth. viij times ten, which is called. 4 score. If he stand in ỳ third place, as heer 800, he signifieth. viij. hundreth, &c. Therfore ye must know perfectly the significatiõ of euery place, before ye cã perfectly number. Wherfore vnderstand ye, ỳ the fyrste place is a place of vnites, so ỳ any figure standing in that

place

place, signifieth no more, then when he standeth alone. The second place is a place of tens, the third is a place of hundredes. The fourth place is a place of thousands. The fyft place is a place of ten thousands. The, vi, place a place of hundreth thousandes. The, vii. place is of thousand thousands, which is called a Myllion. The viii. place is of ten myllions. The ix. is a place of hundred myllions. The x. of thousand myllions. The xi. of ten thousand myllions. The xii. of a hundreth thousande myllions. The xiii. of a thousande thousand myllions, & so foorth infynitely euery place ensuing, signifyeth ten tymes as much as the place goyng before. Thys must you know perfectly, what euery place giueth and signifyeth: for the place giueth denomination, & the figure standing in the same place, expresseth how many of the same denomination is to be vnderstand, as in example yee shall more plainely perceiue.

In this summe 340087619. this figure 4 standeth in the .iiii. place, nowe by your rule before, the .iiii. place is a place of thousands: then this figure 4 standing in the same place, giueth vs to vnderstand that it is .iiii. thousand. Likewise this figure 8 standing in the .vi. place. now by your rule as afore, the .vi. place is of hundreth thousandes, then this figure 8 standing in that place receiueth denomination of the place, & representeth to vs. viii. hundreth thousandes. Likewise this figure 1 standeth in the second place, & because the second place is a place of tens, therfore this figure 1 standing there, is bound to the signification of the place, and so signifyeth one ten. If a figure of 4 stoode there, it should signifie .iiii. tens, that is fourty, and so forth. Then for a farther declaracion of the forsayd summe, & all other lyke summes. This figure 9 standing in the first place, signifieth but himselfe which is .ix. This figure 1 standing in

the seconde place, because the seconde place is euer a place of tens, signifyeth one ten. The figure 6 standing in the thyrd place, because the thyrd place is a place of hundrethes, doeth signifie .vj. hundreth. The figure 2 in the .iiij. place signifieth .ii. thousand. The figure 7 stãding in the fyrst place, and that place being a place of ten thousandes, signifyeth .vii. tymes ten thousande, which is .lxx. score and temie thousande. The figure 8 in the .vi. place signifieth .viij. hundreth thousand. The cipher o that standeth in the .vij. place, signifieth nothing, but onely maketh vp a place, that the figures significatiue following, may encrease their signification. Like iudgement is of the other cipher standing in the .viij. place. In the .ix. place standeth the figure of 4. and this place is a place of hundreth millions, therefore this figure 4 there signifyeth .iiij. C. millions. In the .x. place standeth the figure 3. and this place is a place of

thousand

thousand myllions. therefore it signifyeth three thousand myllions. So the whole summe is three thousand myllions, foure hundred myllions, eight hundred thousand, three score thousande, twelue thousand, vi. hundred and xix. Now to exercise your selfe in Numeration, number with your selfe these summes following, as they be here set forth in this Table. Which notyng it well, it shall easely teach you bothe to know the value of the places, and also the summe of euery fygure.

The description of this Table following.

This Table (as you may see) hath eight places, and in eche of them are set all the Digets, whose certayne value is wrytten on the ryght hand of the Table, and the value vncertain on the left hand. So that heer by, you may learne how to expresse any number that you wyll.

The Table.

E. Millions.	Millions.	C. thousand.	E. thousand.	Thousands.	Hundreths	Tennes.	Vnities.	The denominatours of the places or value vncertain.
1	1	1	1	1	1	1	1	One.
2	2	2	2	2	2	2	2	Two.
3	3	3	3	3	3	3	3	Three.
4	4	4	4	4	4	4	4	Foure.
5	5	5	5	5	5	5	5	Fyue.
6	6	6	6	6	6	6	6	Syxe.
7	7	7	7	7	7	7	7	Seuen.
8	8	8	8	8	8	8	8	Eyght.
9	9	9	9	9	9	9	9	Nine.
0	0	0	0	0	0	0	0	Cipher.
Eyght.	Seuenth.	Syxth.	Fyft.	Fourth.	Third.	Second.	First.	The order of the places.

Fur-

Of Numeration.

¶ Furthermore thou must note, that there be in Algorisme three manner of numbers, Diget number, Article, and Compost.

The diget number, is all manner of numbers which are vnder. x. as these.

2 8 7 6 5 4 3 2 1

The Article number is, all numbers which are of. x. as these.

10 20 30 40 50 60 70 80 90

The compounde number is all manner of numbers which are compound or made of the diget and article together as followeth.

11 12 13 14 15 16 17 18 19

21 22 23 24 25 26 27 28 29

31 32 33 34 35 36 37 38 39

And so forth of all other. This is sufficient for the knowledge of number in Algorisme.

¶ The end of Numeration.

The

ADdition is a collection of diuers and sundry sums into one totall sum, which contayneth as much in him as all the other sums, beeing before sundry. In Addition are two numbers to be considered, the one is, the numbers which must be adioined together, the other is, the numbers which redoundeth of theyr addition together, which otherwise is called ỹ totall sum. Then when ye will ad many sums together, first write them faire the one directly vnder the other, so that the fyrst figure of the one, be right vnder ỹ first figure of the other, and the second vnder the second, euery place correspondent vnder other. That done, draw a line vnder all these seuerall sums, as is to see in the example following. And when you will adde your numbers together, begin at the fyrst places of your sums, & adde all the figures that ye see in the first places of all your summes together, and that that commeth of the addition, whether it

it be diget number, article, or compost: If it be but diget, set that diget beneath the line, directly vnder the same fyrst places. If it be article, put a cipher beneath ỹ lyne, right vnder the same fyrst place, & reserue the article to be added to the next places of thy summes, & there doo likewise. If it be compost, set the diget vnder the lyne, right vnder the same places, & reserue the article in your minde, adding it likewise to the next places of thy sums. When the fygures standing in ỹ last places of your sums be adioyned together, if any article or articles remain: set thé down next to ỹ figure ye set last before, vnder the same lyne, as heere for example.

The fyrst summe.	6	7	8	9	4	
The second summe.	3	4	5	6	7	
The third summe.	2	3	4	5	6	
The fourth summe.	7	8	9	3	4	
The fyft summe.	6	7	4	2	5	
The fyrst summe.	3	4	3	2	2	
Summa totalis.	3	0	6	5	9	8

Your figures set after this sort, adde all the figures that ye fynde in the fyrst places of all the summes togeather, beginnyng at the nethermost saying: 2 & 5 is 7, and 4 that is 11, and 6 that is 17, and 7 that is 24, and 4 that is 28. This is the whole summe of the figures added togeather, which be founde in the fyrst places, the which nomber is compost. Wherefore as it is in your rule, ye muste drawe a lyne vnder the whole summe, setting the diget ryght vnder the same place, beneath the lyne, the whyche is 8, and keepe the article in your minde, which is 2. Nowe to the second place toward the left hand, say: 2 that I haue in my minde, and 2 is 4. and 2 maketh 6, and 3 is 9, and 5 is 14, and 6 is 20, and 9 is 29, nowe set the 9 vnder 2, and keepe 2 in minde, and adde them to the fyrste fygure of the thyrde place which is 3. Nowe say, 2 and 3 is 5, and 4 is 9, and 9 is 18 and 4 is 22, and 5 is 27, and 8 is 35. Nowe set 5 vnder

der 3, and keepe three in minde. Now to the .viij. place toward the least hand, where 4 standeth, now 3 that you haue in minde and 4 is 7, and 7 is 14, and 8 is 22, & 3 is 25, and 4 is 29, and 7 is 36 set 6 vnder 4, & keepe 3, and adde that 3 to the vndermost figure of the first sum that is 3, and say 3 and 3 is 6, and 6 is 12 and 7 is 19, and 2 is 21, and 3 is 24, and 6 is 30. All the figures of this place added together as you see, maketh 30 article number: wherefore according to your rule, set a cipher 0 vnder that place beneath the line, and the article which is 3 next to the same cipher, and all is finished. And all these summes thus collected together, maketh 306598.

¶ Another example of Addition.

1	0	0	6	6	7	8	4	5
6	0	0	0	3	1	9	5	0
5	0	0	5	4	5	1	6	1
8	0	1	2	0	2			
				6	4	2	4	
1	2	0	2	0	5	2	5	7

Begin

Begyn firste as ye dyd before, at the first places adding them altogether, beginning at the nether most, saying: 1 & 2 is 3, & 1 is 4, and 5 is 9, thys is the whole summe of the figures standyng in the first place, the which is diget nũber, and therfore according to the rule, set it right vnder ỹ same place beneath the lyne. Then proceede to the second place, and begyn at the nether end saying: 2 and 6 is 8, and 5 is 13, and 4 is 17, thys number is compost number, therfore set the diget right vnder that place beneath the line, which is 7, reseruing the article in your mynde, and so to the third place, saying: 1 that I haue in my mynde and 4 is 5, and 2 is 7, and 1 is 8 and 9 is 17, and 8 is 25, this number also is compost, wherefore set the diget 5 vnder that third place, & reserue the article 2 in mynde to the next place, then to the next place saying: 2 that I haue in mynde & 6 is 8, and 1 is 9, and 5 is 14, and 1 is 15, and 7 is 22, this is also com-

poſt, therefore ſet the diget 2 vnder that iiii. place, and reſerue the article 2 to the next place. Then to the fift place ſaying 2. that I haue in minde and 4 is 6, and 3 is 9, and 6 is 15, this is alſo compoſt number, ſet the diget 6. vnder the fyft place, and keep the article in minde. To the. vi. place ſayinge 1 that I haue in myade and 8 is 9, and 5 is 14, and 6 is 20, this is article number, therefore according to the rule ſet ciphet vnder the place beneath the line, & keep the article in mind, and come to the. vii. place in ỹ which places becauſe thou findeſt nothing but ciphers, to the which thou mighteſt adiome thy article reſerued, ỹ which was 2 therefore vnder the ſame vii. place ſet that ſame reſerued 2 and then come to the. viii. place, & there findeſt ỹ nothing but ciphers, wherefore vnder the ſame place ſet beneath ỹ line a cipher, according to the rule. Then come to the. ix. place & ſay: 5 and 6 is 11 and 1 is 12, the which is compoſt number,

ber,

ber, therfore set the diget which is 2 vn
der the lyne, and reserue the article in
minde, which is 1, now because there
is no mo places whereunto ye might
adde this reserued article, therefore ac-
cording to your rule ye shall set it down
next vnto the figure that ye dyd set vn-
der the lyne laste, as in your example.
These two examples were sufficient
inoughe to the readynes of Addition.
Howbeit yet that it may be the plainer,
I will set downe an other example.

14 6 9 9 0 0 0 ¶ Adde the fyrste
3 8 2 9 0 2 0 0 place together. First
01 0 9 16 0 0 there thou fyndest
1 0 2 0 0 0 0 nothig but ciphers,
55 1 0 0 8 0 0 wherefore set a cy-
pher vnder the line
and so lykewyse in the second place. In
the thyrde place thou fyndest 6 and 2,
which maketh 8, the which for because
it is diget number, set it vnder that
place beneath the lyne.

In the .iiii. place is 1 and 9 whych maketh 10, and because that this is article number, set a cipher vnder that place, beneath the line, and reserue the article to the next place saying 1 that I haue in my mynde and 2 is 3, and 9 is 12, & 9 is 21, and 9 is 30. this is also article nũber, wherefore set a cipher vnder that place beneath the line, & reserue the article 3 in mynde to the next place. Then come to the .v. place saying: 3 that I haue in my mynde and 2 is 5, and 6 is 11, thys is compost number, therefore I set the diget whych is 1 ryght vnder that place beneath the lyne and reserue the article 1 to the next place, saying: 1 and 1 is 2 and 1 is 3, and 8 is 11, and 4 is 15, thys is also compost, therefore set the diget 5 vnder the lyne, and adde the article reserued to the fygure in the next place, saying: 1 and 3 is 4 and 1 is 5, thys is nowe called dyget number, therefore let it vnder lyne, and then all is fynished.

¶ Cer=

Certayne examples to practise your selfe in, touching the exercise of Addition.

16768900	100000000
36219880	134562899
92000032	200201011
11116841	111000000
19421326	38921000
175526979	923973900
90902010000	64000100
265126000000	86000000
25432071	99800000
21654000	78000000
962000	59000000
1000	10006033
1117895200722	396800033
9000026	30002688
2058121	10609865
9010000	10009399
9096090	10009399
1000000	20009177
30164471	80640499

Of the proofe of Addition.

For the proofe of Addition, ye shall make a Crosse after the fashion that followeth, and then ye shall come fyrst to the addible summes, and pluck out all the nines that ye fynde there, and the rest whatsoeuer it bee, that wyll not make 9. set it at the vpper syde of the Crosse. Then come to the totall summe vnder the lyne, and lyke wise deduct all the nines that ye can fynde there, and that that remayneth, not able to make 9, set it at the vndermost part of ỹ cros, and if it be like the remanant of the addible number which standeth in the vpper part of the Crosse, your woorke is good, if not, it is nought, as by example ye shall the better perceiue.

An example of the proofe.

A	2	5	0	6	7	0	
B	3	3	0	4	2	8	1
C	5	8	1	0	9	8	1

Now

Now for to make the proofe of these numbers, ye shall begin at the fyrst fygure that ye haue made, in saying: 8 & 0 is 8, and 2 is 10, take away 9, then there resteth 1, then 1 & 7 is 8, and 4 is 12, take away 9 rest 3, then 3 & 6 is 9, thē to the two ciphers of nothing, that nothing doo signify, then 3 and 5 is 8, & 3 is 11, take away 9, rest 2, then 2 and 2 is 4, this 4 it behoueth you to put at the neather ende of the crosse. Then come to the place of C vnder the line, & say 8 (ye shall leaue the 9 and the cipher 0 that is nothing worthe) and adioyne 1 therto and make it 9, & leaue that, thē 8 and 5 is 13, take away 9 rest 4, which 4 ye shall put at the vpper ende of the crosse, and then is your proofe good, for both ỹ ends be like as ye see in thys fygure of the crosse. And at the two other endes ye shall put .ii. 00, in certifying that of them commeth nothing.

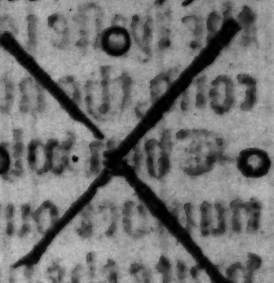
¶ An other example.

A	7	8	9	1	5	4	3	2	6	li.
B	4	9	3	0	0	6	7	1	5	li.
C	2	0	9	9	3	4	7	8	4	li.
D	4	6	0	6	4	5	5	3	0	li.
E	9	3	6	4	5	8	7	7	8	li.
F	4	4	5	1	9	3	0	0	1	li.
G	3	3	3	4	3	9	3	1	3	4	li.

We shall say semblably 1 and 8 is 9, & alwaies leaue them, then 0 that dooth nothing, then 4 & 5 been 9, than 6: then we shall returne to the tenthes, & shall fine 9, that dooth nothing, then 7 that maketh 9 rest 4, then 3 beene 7, then 8 ben 9 rest 6 then 1 is 7, then 2 is 9: then come to the place of hundzethes, then 0 is nothing worth, then 7 and 5 is 9 rest 3, then 7 is 9 rest 1, then 7 is 8 and 3 is 9 rest 2: then come to the place of thousandes, and adioyne the 2 to the 3 that is 5, then 8 is 9 rest 4, & so consequently vnto the ende. And if peraduenture we

fynde

fynde this fygure 9 because of the briefe-nes, we shall leaue it. And shall finde at the ende 9, therefore we shall put at the ende of the crosse o, in signifying that there is nothing aboue 9. And so shall we do in the number of G and, we shall fynde lyke 9, for the which semblably we shall put o. And so is the Addition good and well made.



¶ The proofe.

As touchynge of Addition in broken numbers, ye shall fynde that vnder the tytle of Reduction hereafter.

The ende of Addition.

¶ Of

¶ Of the thyrde part, called Substraction.

Substraction is a manner of abatyng or subducting a lesse sum out of a greater, or lyke of lyke, shewyng what remayneth.

In Substraction are two numbers, the fyrste is the number abated, the second, the number abating.

Then when ye wyll subtract any one number out of an other: fyrst ye shall wryte the number to be abated, and vnder it directly figure vnder figure, and place vnder place wryte the abatour, & beneath these two summes drawe a lyne, then begin your Substraction at the fyrst places, and subduct the figure stãding in the first place of the abatour, of the first figure standing in the fyrste place of the number to be abated, and the rest that remaineth after the abatement set it right vnder the same place beneath the line, and so doo likewise in the second, & third, and all other places. And when ye haue all done, the nũber that

that ſhall remaine vnder the lyne, ſhall be that that remayneth after the ſubduction of the abatour of the number abated. As for example.

Lent. 8 3 4 5 6
Paid. 4 1 1 3 1
Reſt. 4 2 3 2 5

I lent a mã 83456 li, of the whych hee hath paide me 4113 li. againe, now I deſyre to knowe howe much remayneth. Then according to the rule, fyrſt I ſet the lent mony, & right vnder that I ſet the repayd money figure vnder figure, and place vnder place, as ye ſee by the example. Vnder bothe theſe ſummes I muſt drawe a line, and begin to ſubtract the vnder ſum out of the vpper, ſaying: 1 out of 6 remayneth 5, this 5 ỹ remayneth according to the rule ſet vnder the ſame place beneath the line, then to the ſame place beneath the line, then to the ſecond place, pluck 3 out of 5, remaineth 2, ſet ỹ vnder the lyne: then to the third place, pluck 1 out of 4 remayneth 3, ſet that vnder the lyne: then to the fourth

place,

place, take 1 out of 3 remaineth 2, set it vnder the lyne: then the fift place, take 4 out of 8 remayneth 4, set that also vnder the line, and so thou haste kinyshed. Then thou shalt vnderstande that it which is vnder the line is the remanāt of the money not yet payd.

¶ Another example.

£7660	li.
£7560	li.
20100	li.

Begyn at the fyrst place saying: 0 out of 0 remayneth nothyng, set the fygure of nothyng vnder ỹ lyne: then to the second place 6 out of 6 remayneth nothing, set the cipher vnder the lyne: Then to the thirde place 5 out of 6 remayneth 1, set 1 vnder ỹ lyne: Then to the fourth place 7 out of 7 remayneth nothing, set the figure of nothyng vnder the lyne. Then to the fyft place, take 6 out of 8 remayneth 2, set 2 vnder the lyne, & thus thou haste done. Then 20100 remaineth yet to be paid.

Now thou shall note that some tyme is

it chaunceth that the fygure standyng beneathis greater then the figure stan-ding abooue him, in the summe from whom subductiō is made. In this case thou shalt in thy minde put ten, to the fygure in the vpper summe, and then subtract the neather fygure out of the same, set the remanant vnder the lyne, and for the same ten ỹ which thou did de-sit put to ỹ vppermost figure to make him greater, thou shalt adde one to the next fygure standynge in the neather summe, and then subtracte that lyke-wyse oute of the figure aboue him (if the fygure aboue be bygger then the fi-gure beneath with his addition, either els equall) and that remayneth, set it vn-der the lyne, as ye did in the other ex-ample. If the figure aboue be lesse then the figure beneath, thē do to him as ye dyd to the other before, that is to saye, adde ten to him, and so forth in al other places. Where the neather figure of the abatour is greater then the vpper fy-

gure from whence it should be abated, as by this example ye shall more clearly perceiue.

¶ An example.

57295490	Begin your substraction
48765297	saying : 7 out of 0 that
08530193	cannot be, therefore for-

because that 7 standing in the neather summe, is more then the fygure standing in the fyrst place of the vpper summe : ye must adde a tenne, then deduct your 7 out of 10, and there remayneth 3, then come to the second place, and for the ten that ye borowed in your minde, & added it to that figure in the first place to make it byg inough for the fygure vnder it to be subducted out of it: for the same ten (I say) ye shall put to the next fygure in the neather place of the neather sum 1, then say 9 & 1 is 10, then subduct this 10 out of the figure of 9 standing aboue it in the vpper summe, & that ye cannot, therefore

doo as you did before in the fyrst place, put 10 to the. 9. in your mynde, saying: 10 and 9 is 19, then deducte the 10. beneath out of ỹ 19 abooue, & ther remaineth 9. to be set vnder the lyne. Then to the figure standing in the third place in the neather summe, put 1 for the ten that you borowed in your minde, the which ye added to 9 in the second place of the vpper sum to make it greater, saying: 1 and 2 is 3, subtract that 3. out of 4 abooue it, remaineth 1 to be set vnder the lyne. Then to the fourth place, take 5 out of 5 remayneth nothing, set a figure of nothing vnder the lyne: and come to the. v. place take 5 out of 9, remaineth 3. to be set vnder the lyne, so to the. vi. place, take 7 out of 2 that cannot be, therfore put to the same 2. according to thy rule 10, & then it is 12. then subduct 7 out of 12. remayneth 5 to be set vnder the lyne, & for ỹ same 10 that thou borowedst in thy minde to put to thy figure of 2. in the vpper summe,

thou

thou shalt adde 1 to the figure standing in the next farther place, in the neather sum, comming to the same place whych is the seuenth place, saying 8 and 1 the which I haue to set to him is 9, then 8 out of 7, that I cannot, wherefore likewyse agayne I must helpe the same 7 with a ten, and then it is 17 out of that, now subtract your 9 and remayneth 8 to be set vnder the lyne: nowe as you haue done before in all other places for the 10 here borowed and adioyned, the adde 1 the next figure standing in the seuenth place of the neather number, saying: 4 and 1 is 5 then subduct thys 5 out of the 5 aboue, and remayneth nothing, wherfore set a fygure of nothing beneath the lyne, and so ye haue done.

Howbeit ye shall note that when ye haue a cipher to be wrytten in the last place of any summe, ye shall not write it for in the last place it signifyeth nothing of it self, neither doth it augment the signification of any of the other

Yet one other example wyll we set, & then make an end of Substraction.

1000081007100 Ye shall begyn
484057480087 saying: 7 out of
5190235270130, that cannot be
for ye cānot take
7 out of nothing, wherfore as ye haue done alwaies in the example afore, put ten to that cipher, & that maketh 10. thē deduct your 7 out of it now, and there remayneth 3 to be set vnder the lyne. Then for this ten that ye ad to the fygure in the first place of your vpper nūber, set 1 to the figure standing in the secōd & next place of the neather number saying: 8 and 1 is 9, then 9 out of the cipher abooue, that cannot be, therefore as ye did before make that 0.10, & then subduct your 9 out of this added 10, remaineth 1 to be set beneath the line, thē for this 10 lykewyse that you borowed in the second place of your vpper number, ye shal set one to the next figure stā

lyng in the third and next place of the neather summe, saying: 1 and the 0 is one, then take that 1 out of 1 aboue him remayneth nothing, set a figure of nothyng beneath the lyne, then to the iiii. place take the 0 out of 7 aboue remayneth 7 styl to be set vnder the lyne. So to the .v. place, take 8 out of 0 that ye cannot, therfore put 10 to the cipher & then subduck it, and remaineth 2, set that vnder the lyne: for thys ten adde 1 to the next fygure in the .vii. place, which is 4 then 4 and 1 is 5, and 5 out of 0 that yee cannot, then make 0 10. & take the 5 out of it remaineth 5 to be set vnder them for the borowed ten, like wyse set to the next figure in the .vii. place of the neather nũber 1 saying: 1 and 7 make 8, & 8 out of 1 that cannot be, therefore put ten to that 1, and then 10 and 1 is 11, out of this 11 deduck your 8, remayneth 3 to be set vnder the lyne: then for this 10 to the next figure in the .viii. place of the neather summe, set 1 saying: 5 and 1 is 6.

then

then 6 out of 8 remaineth 2, then to the ix place, take 0 out of 0 remaineth also 0, set that vnder the lyne in the .x. place take 4 out of 0 that cannot be: therfore put 10 to that 0 and subduck your 4, remaineth 6, then to ỹ figure in the next place which is the .xi. place, put 1 saying 8 & 1 is 9, then 6 out of 0, that cannot be therfore put ten to it, and then subtract your 9 out of 10 remayneth 1, set it vnder the lyne: for his borowed ten put 1 agayne to the next figure whiche is 4, saying: 4 & 1 is 5, 5 out of 0 that cannot be, therefore like wise againe make it 10 and then take 5 out of it, remayneth 5, then again for your borowed 10 put 1 to the next place. But because there be no mo places, therefore subtract it alone out of the figure aboue, saying: 1 out of 1 remayneth nothing, therfore nothing is to be set vnder the lyne, not so much as a cipher, for because that it is in the last place. So then the summe vnder the line is the remaine that remaineth,

after the subtraction of the lower sum, out of the vpper summe.

¶ The proofe of Subtraction.

The proofe whether ye haue subtracted wel or no, ye must adde the remain to the number payd, and if they twaine added together doo make the first sum lent completlye, then is it well subtracted: if not, it is not well subtracted, as by the last example ye maye well perceyue. For by the rule of Addition adde 3 to 7 therof commeth 10, set the cipher vnder the lyne, and reserue the article to the next place forth according to the rule of addition, and thou shall see these two summes added together, to come to the fyrst lent sum. And this of Subtractiõ shalbe sufficient.

(.·.)

¶ The

The fourth part called Multiplycation.

Multiplication is a māner of encrealynge or augmentynge one sum by another. In thys feate of multiplication are.iii. numbers to be noted, the multiplied number, the multiplier, & the number that redoundeth of the multiplication of the multiplied number by the multiplier, as in example. Multiply this number 4 by 3, and therof come 12, 4 is the number multiplied, 3 is the number multiplyer, and 12 the thyrde number that redounded of the multyplycation of one of the nūbers by the other. Then for more experience & readie woorking in this kinde of operation, ye shall perfectly know by memory the multiplicatiō of one dyget by an other, the which ye shall haue heer in this table folowing. Of the which one diget ye shal looke for in the heade of the table, and the other on the leaft syde of the Table.

The Table.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

By this table ye shall sufficiently learne to multiply one diget by an other, as for example. If ye wil multiply 9 by 5, look for the 9 at the head of the table, & for 5 ỹ multiplier at the left side of the table, then with thy finger descend down frō the place wher 9 standeth til ỹ come before the place wher the 5 stādeth, & ther in the same angle ỹ shalt find 45. & that cōmeth of 5 times 9, & thus by al other. There is also a proper rule for the multipli-

tiplication of one diget by an other, & it is this when thou wilt multiply one diget by an other, note the distaunce of the greater diget from 10, and by the same distaunce multiply the lesse diget or equall, and that that proceedeth of it, deduct out of the article whom the lesse number dooth denominat, and the rest is it that ye seeke for, as for exrample: if ye wyll multiply 7 by 5 first see the distance betweene 7 which is the greater number and 5, and that is by this 3 multiply 5, and that is 15, then subduct this 15 out of the article that 5 that lesse number dooth denominate, whych is 50, then remaineth 35 that is 5 times 7: so likewise shal ye do if the multiplier & the multiplied be like. How be it most ready it is to know without booke very perfectly ỹ multiplicatiõ of euery diget one in an other. Now when ye wyl multiply any one nũber the one by the other, first write faire your nũber to be multiplied, & vnder it ỹ multiplicatour

beneath bothe theſe ſummes, ye ſhall drawe a line. Thē ſhal ye conſider whether your multiplyer bee a diget or article, or els compoſt number. If it be diget nūber, ye ſhall begin to multiply by the diget, the figure or diget ſtāding in the fyrſte place of the number to bee multiplied, and that that commeth of it if it be but a diget, ſet it vnder the line, ryght vnder the ſame place, and then proceede further to the next place, and multiply the figure ſtanding in ỹ place by the ſame multiplier, and that that re dounde th of it, if it be a diget, ſet it like wyſe vnder the lyne, ryght vnder the ſame place, and ſo doo lykewiſe in euerye place following, vntyll ſuche time as all the figures ſtanding in euerye place be multiplyed. Then that which ſhall bee founde vnder the lyne, is the ſumme comming of the multiplicatiō of theſe two numbers, the one by the other. As by example ye ſhall the better perceiue.

If

2 3 1 4
2
4 6 2 8

If ye will multiply this sum 2314. by thys 2, ye shall set your fygures after this sozt, as ye see thē. Begyn your multiplication saying: 2 tymes 4 is 8, set that 8 vnder the lyne, then come to the next place and say: 2 tymes 1 is 2, set it vnder the lyne, then to ỹ thyzd place, 2 times 3 is 6, set that vnder the lyne, so to the fourth place 2 tymes 2 is 4, set that vnder the lyne, also, and then thou hast done, so that this number 4628 vnder the lyne, is it that commeth of the multiplication of thys summe 2314 by thys number 2. But if it bee so that in the multiplication of any figure in the number multiplicable, by the multiplyer ỹ it which redoũdeth of it be article number: then ye shall set a cipher beneath the lyne right vnder the same place where the multiplicatiō is, and reserue the article to be added to the number that proceedeth of the multiplication of the figure

in

in the next place by the aforesaid multiplyer, the whych lykewise if it amount to an article, do lykewise as I bad you to do in the fyrst place: but if it be compost number, then shall ye set the dyget vnder the same place beneath the lyne, and reserue the article to be added likewise, as is before saide of article nomber, as in thys example.

8 1 4 1 6 4 2
5
4 0 7 0 8 2 1 0

If ye wyll multiplye thys number 8141642 by this figure 5: Begyn at the fyrst place saying: 5 tymes 2 is 10: now because that thys number is article, ye shall according to the rule before set the 0 vnder the line, and reserue the article 1 to be added to the number that proceedeth of the multiplication of the next fygure, standing in the next place of the sum multiplicable, by the multiplier: so then come to the nert place saying: 5 tymes 4 is 20, to thys 20 adde 1 for the article that ye reserued, and that

maketh 21, therefore because ỹ this is a compost number, therfore set the dyget vnder the lyne, beneathe the same place, and reserue the article to the next place. Then come to the third place saying: 5 times 6 is 30, to this add the article 2 which ye reserued in ỹ place next before, and then it is 32, set the dyget vnder the lyne as ye did before, reserving the article to the next place: then come to ỹ fourth place saying: 5 times 1 is 5, to thys adde the article reserued, which is 3, and that maketh 8, set this diget number vnder the line, and then come to the .v. place saying: 5 tymes 4 is 20, now because this number is article, set a 0 vnder the place beneathe the lyne, reseruing the artile 2 to be added vnto the next places: Then come to the .vi. place, saying: 5 times 1 is 5, to this adde the article 2 reserued, & then it is 7, set it vnder the lyne, then to the seuenth place, saying: 5 tymes 8 is 40: nowe because it is an article number:

ye

ye shall set a cipher vnder the lyne and reserue the article 4 to the next place, & for as muche as there is no mo places, ye shall set thys 4 vnder the lyne nexte vnto the o that ye set downe last, and then you haue done.

When that your multiplyer is compost or article number, thē shall ye take the fyrst figure of your multiplier, & by him shall ye multiply all the figures of the multiplicable numbers, setting alway that that amounted of it beneath the lyne as ye dyd before. And when ye haue multiplyed the number multiplycable by the fyrst figure of the multiplier: then multiplie it agayne by the second figure of the multiplier, setting euermore the first figure of the number multiplicate directly vnder the fygure multiplicatour, in what place so euer it stand: and the number multiplicable is multiplied by al the figures of the multiplicatour, then make a stryke vnder them al, adding all the numbers multi-

plicate

plicate together as they stande, & that which proceedeth of that additiō, is the number multiplicable, now multiplied by the whole number multiplicatour, as by thys exampie yee shall playnlye perceyue.

2 3 4 5
1 2 3 4
---
9 3 8 0
7 0 3 5
4 6 9 0
2 3 4 5
---
2 8 9 3 7 3 0

¶ If ye wyll multiply this number 2345 by this number 1234, set them fyrst as ye see heere 2, vnder them draw a lyne, then begyn wyth the fyrst figure of the multiplicatour, whych is 4, and by him first according to the rule multiply all the multiplicable number throughout saying: 4 tymes 5 is 20, set the cipher vnder the lyne, reseruing the article 2 to the next place. Then to the seconde place 4 times 4 is 16, to that put your reserued article 2, and is 18,

set

set the diget 8 vnder the line, reseruing the article 1. Then to the thyrd place 4 tymes 3 is 12, and 1 reserued from the place before that is 13, set the diget 3 vnder lyne, reseruyng the article 1, then to the fourth place 4 tymes 2 is 8, and 1 reserued is 9, set that diget 9 vnder the lyne, and so haste thou multiplied this nũber multiplicable by the second figure of multiplicatour. Now then according to the rule afore, multiplie the multiplicable number by the second figure of the multiplicatour, saying: 3 tymes 5 is 15, set the diget 5 vnder the lyne, according to the rule, whych byddeth to set euermore the fyrst fygure of the nũber multiplicate vnder the place where the figure multiplicatour dooth stande: as heer nowe thou multiplyest the multiplicable by the seconde figure of the multiplicatour, whyche is 3, the say: 3 tymes 5 is 15, set this diget 5 vnder the lyne, and beneathe the fyrst number multiplicate, ryght vnder

the

the figure multiplicatour, as thou seest in the example, and reserue the article 1 then to the second place of the multiplicable, 3 times 4 is 12, and 1 that is reserued is 13, set the dyget 3 vnder the lyne, as ye see in the example, & reserue the article 1, and so to the thyrd place, 3 times 3 is 9, and 1 reserued is 10, set a 0 vnder the line, and reserue the article 1. So to the .iiii. place saying: 2 tymes 3 is 6, and 1 reserued is 7, set it vnder the lyne, thus haue ye done your multiplication by the second figure of the multiplicatour 3. Then take the thyrd figure of multiplicatour, which is 2, and multiply also all the numbers multiplicable by him saying: 2 times 5 is 10, set the 0 beneath the lyne, right vnder the place, where this figure 2 the multiplicatour standeth, as ye se in the example & reserue the article 1, then to the second place 2 times 4 is 8. & 1 reserued is 9, set ỹ 9 vnder the line: thẽ to ỹ .iii. place, 2 tymes 3 is 6, set that vnder the lyne.

So

So to the fourth place saying: 2 times 2 is 4, set that 4 vnder the lyne. Now begin to multiply with the fourth and last figure of ỹ multiplicatour, saying: 1 tymes 5 is 5, set the 5 vnder the lyne, as I sayde before, and as ye see in the example, then to ỹ second place, 1 times 4 is 4, set that 4 vnder the lyne, then 1 tymes 3 is 3, set that 3 vnder the lyne, then 1 times 2 is 2, set that 2 vnder the lyne, and ye haue done your multiplication. Then must ye adde according to your rule afore all this single multiplied number together, and that which cõmeth of the addition, is the number that commeth of the multiplication of thys number 2 3 4 5, multiplicable by the number 1 2 5 4, multiplicatour. Then come to the first place, & see what is there, and there ye shall fynde a 0, set it vnder the lyne, and so to the seconde place, there ye shall fynde 5 and 8 which is 13, set the dyget 3 vnder the lyne, reseruing the article 1 to be added to the

next

next place: then come to the .iii. place, there is 0,3 and 3 which is 6, to that ad the reserued 1, and that is 7, set that 7 vnder the line, nowe to the fourth place 5.9.0. and 9, maketh. 23. set the 3 vnder the lyne, reserue the article 2. So to the v. place, 4.6. and 7 is 17, to that adde the reserued 2. which maketh. 19, set the 9 vnder the lyne, and keepe the article 1 in mynde. Then to the vi. place. 3 and 4 is 7, and 1 reserued is 8, sette it vnder the lyne: Then to the seuenth place there fynde ye but 2, wherefore sette it vnder the lyne and then haue ye dodne. So that thys summe vnder the lyne 2893730 is the whole number multiplicate.

Heere foloweth an other example of Multiplication.

A 6426003
B 502000

0000000
0000000
0000000
12852006
0000000
32130015

C 3225853506000

Your figures set after this sorte, A. is the multyplycable number, B. is the number multiplicatour. C. is the number multiplicate, which commeth of the addition of all the seuerall numbers together standing betwene the lines. Begyn then your woorke, taking the first figure of B. the multiplicatour, whyche is o, & by him multiply all the figures of A. the multiplicable, & that that procedeth of it, set vnder the lyne as yee see, & so to the seconde figure of the multiplycatour, which is also o, multiplye all the figures

figures of A. by it likewyse, and set that which cõmeth of it, vnder ỹ line, ryght vnder the second place where the multiplicant figure standeth. Then to the third figure, which is also 0. multiplie all the multiplicable number A. and set that which cõmeth of it right vnder the thyrd place beneath the lyne, as yee see plaine in your example. For of the multiplicatiõ euermore by ciphers cõmeth nothing but ciphers. Nowe to the iiii. place of B. the multiplicatour, there shall ye fynde the figure 2, multiply then al A the multiplicable nũber by this fygure 2 saying: 2 tymes 3 is 6, set that 6 vnder the line, right vnder the place wher the multiplicatour 2 standeth, as it appeareth in your example. Then to the, ii. place, 2 tymes 0 is nothyng, sette that 0 vnder the lyne, next the aforesayde 6, and so to the thyrde place, 2 tymes 0 is nothynge, set the figure of nothynge downe vnder the lyne, and so to the fourth place, 2 tymes 6, is 12, sette the

diget 2 vnder the lyne, and reserue the article 1 to the nexte place. Then come to the syxte place, 2 tymes 2 is 4, and 1 that I reserued is 5, set that 5 vnder the lyne. Nowe come to the syxt place saying: 2 times 4 is 8, set that 8 vnder the lyne. So to the .vii. place, 2 tymes 6 is 12, set the dyget 2 beneath the lyne, and reserue the article 1 to be set in the next and last place, as yee see in the example. Thus haue yee multiplyed A. the multiplicable by .iiii. sygures of B. the multiplicatour, therefore nowe take o the .v. figure of the multiplicatour, & by it also multiply all the figures of A. the multiplicable, & thereof shall come all ciphers to be set vnder the line, as ye see here in the copy. Then to the .vi. sygure of B. the multiplicatour, which is 5, by this 5 also multiplye all the sygures of A. the multiplicable, saying: 5 tymes 3 is 15, sette that 5 beneath the lyne, ryght vnder the syxte place, where 5 the multyplicatour standeth, as is to see in the

copy

copy, and reserue the article to the next place. Then come to the seconde place & say: 5 times 0 is nothing, set the 1 which yee reserued in your mynde vnder the lyne, and so to the thyrde place, saying: 5 tymes 0 is nothing, set the 0 vnder the lyne. Then to the fourth place saying: 5 tymes 6 is 30, set the cypher vnder the lyne, reseruyng the artycle 3 vnto the next place. Then come to the .v. place saying: 5 tymes 2 is 10, and 3 that I reserued is 13, set ỹ diget 3 vnder the line, and reserue the article 1 to be added to the next place. So to the .vi. place, saying: 5 tymes 4 is 20, and 1 reserued is 21, set ỹ diget 1 vnder the lyne, reseruing 2 the article to the next place. Then to the .vii. and laste place, saying, 5 tymes 6 is 30, and 2 that was reserued is 32, sette the dyget vnder the lyne, and reserue 3 the article to be set in next & laste place beneath the lyne, as yee maye see in the example, and so is all finished. Then vnder all these particular summes drawe

a lyne, and adde all them together, settyng euer that whych commeth of the addition vnder the lyne. as is in the example, the whyche shall amounte vnto this sum, 3225853506000, and thys is it that commeth of the multyplycation of the summe A, by the summe B.

¶ Certayne examples of multiplication, in the which ye may exercise your selfe, to be the more practised in it.

	A 3452367
To multiply by.	B 8892539
	31071303
	10357101
	17261835
	6904734
	1071303
	27618936
	27618929
Sum.	30700308189819
	10150010[illegible]

¶ Two

¶ Two other examples.

64970	7432
To mul. 13	To mul. 324
194910	29728
64970	14864
	22296
Sū. 844610	Sū. 2407968

As for the multiplication by squares is neyther worth the wrytyng, nor the readyng. And whereas in other copies is set duplacyon, tryplacyon, and quadruplacion, all that is superfluous, for so muche as it is contayned vnder the kynde of multiplication, and they that are expert in this feate, may ryght well perceyue it.

¶ The proofe of multiplication.

The proofe of multiplication may be by ii. meanes, by ỹ subducting out of all ỹ 9, & the second way is by partiction. As concerning the first waye, yee shall fyrst

make a crosse, then beholde the multyplicable number, and subducte out of it all the nynes, and that that remayneth not able to make 9, sette it at the vpper end of ꝑ crosse. Then come to the multiplicatour, and doo lykewise in hym, and that which remaineth (all the nyne subducted) set it at the vnder part of the Crosse. Then multiply the fygure standing in the vpper part of the Crosse by the figure standing in the neather part of the Crosse, and out of the same that commeth of it, take 9 as ofte as yee can, and that which remayneth not able to make 9, sette it at the ryght syde of the Crosse. Then come to the totall summe multiplicate, and subducte all the nyne out of hym lykewise, and that whych remayneth not able to make 9, set it at the leaft syde of the Crosse, and if it be lyke the fygure standyng at the ryghte syde of the Crosse, then it is well, other wyle it is not. As heere by an example, ye shall perceyue plainly.

An

¶ An example of the proofe.

A 7963
B 1852

15926
39815
63704
7963

C 14747476

To know whether the summe C. be the very summe which commeth of the multiplycation of A. by B. then fyrst subduct all the 9 that ye fynd in the multiplicable A. and the reste set it at the vpper ende of the Crosse, whych yee shall finde to be 7. Then to the multyplycatour B. do lykewise, and see what remayneth, & there remayneth also 7, set that also on the neather end of the croz, then multiplye thys 7 standyng in the vpper ende, by 7 standyng in the neather end, and therof commeth 49. When thou hast taken all the 9 out of thys 49 there

there wyll remaine 4, the whych thou shalt sette at the ryght syde of the crosse. Then come to C. ỹ totall summe of the multiplicatyon, and there like wyse take out all the 9 that yee fynde there, and the rest not sufficient to make 9, set it at the leaft syde of the Crosse, the whyche thou shalt fynde to be 4: and for because that this 4 to be sette at the left syde, is lyke the figure standynge in the ryghte syde (for that is 4 also) therefore thys multiplication is good and well made: and so shall ye finde it lykewyse in all other examples.

The proofe by Partition is to deuide the totall summe C. by the multyplicatour B. and if the quocyent be iuste A. then is it well multiplied, otherwise it is not. But thys way can ye not practise, vntyll such tyme as ye haue learned the feate of Partition.

✠The ende of Multiplication.

✠The

¶The fyft part called Particion.

PArticion is a part of Algozysme, by the which yee may easelye deuide any greater summe by a lesse or equal, shewing howe often times ỹ diuisor is cõtained in the nũber diuisible.

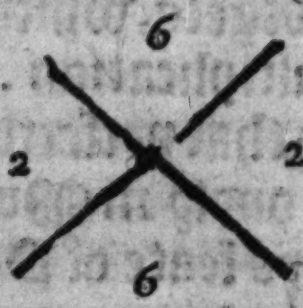
In thys feate of Partycyon be .iiii. numbers to be noted, the number diuysible, the number deuisor, the quotyent, and the remayne, if there be any.

Before you come to Particion it shal be very needefull and necessary for you right perfectly to know the table of multiplication of digets, which is set in the chapter of multiplication. For vnlesse that ye know that perfectly, ye shal stick greatlye, not onely in Multiplycation, but also in thys feate of Particion, and that exactlye had in memorye, the reste shall be farre easier, as for example. If ye wyll knowe howe often tymes 7 is contayned in 68, imagin by and by that thys 7 shoulde be contayned 8 tymes,

then

then if ye know without the booke perfectly the forsayde table, ye shall se that 8 times 7 is but 56, ergo 7 is contained more then 8 tymes is 98. Imagin then and suppose it to be 9 tymes in 68, then by the table see what 9 tymes 7 is, and you shall se that it is 94, wherfore thou mayest conclude, that in 98, 7 is contayned 9 tymes and 4 ouer.

	ø ø	
	1 ø ø 2 ø	Quotient.
Num.	4 5 2 3 1	15077.
	3 3 3 3 3	3 Diuisor.



The proofe.

To deuide thys number 45231 by 3, the 3 is diuisor. Fyrst ye shall set downe your numbers to be deuided, and at the end of that number on the right hande

ye

ye shall make a stryke wherin yee shall set your quocient, and then sette downe your diuisor whych is 3, vnder ỳ fygure that standeth at the vttermost ende at the left hand that is vnder 4, and then say, howe many times 3 may I haue in 4, once 3, and 1 remayneth ouer, sette 1 within the strike, and that 1 that remayneth set ouer 4, then stryke the dyuysor 3 with a dashe of your pen, and sette the diuisor 3 vnder the fygure 5, then ioyne the artycle 1 to the dyget 5, and it is 15, then saye howe manye tymes 3 maye I haue in 15, 5 tymes 3, sette that 5 in the stryke nexte to the fygure 1 and close vp the article 1 and the dyget 5 wyth a cypher ouer either of them, and thē strike the diuisor 3 w̄ a dashe of your pen, & set the diuisor 3 vnder the thyrd fygure 2, & se how many tymes 3 ye may haue out of 2, none, therfore set downe a cipher 0 within the strike next to the fygure 5, & strike out your diuisor wyth a dashe of your penne and set the dyuysor 3 vnder

the

the.iiii. figure 3, then ioyne the article 2 to the diget 3, and that maketh 23, thē see how many tymes 3 ye may haue in 23, 7 tymes 3 and 2 remayneth set that 7 within the strike, nexte to the cipher, and the 2 that remayneth set ouer the fourth figure 3 and close vp ẏ artycle 2 wyth a cypher, then stryke out the dyuisor, and set it vnder the fyste figure 1 at the righte hande, then ioyne the artycle 2 to the dyget 1, and it maketh 21, then see how manye tymes 3 yee maye haue in 21, 7 times and nothing remaineth, then sette the 7 wythin the strike, and close the artycle 2 wyth a cypher 0 ouer eche of them, and strike out the diuisor wyth a dash of your pen, & so the thyrd part of 45231 is 15077.

* The second example.

	∅	
	∅ 8 ∅	6 Diuisor.
Num.	2 3 4 8	Quotient.
	∅ 6 6	390. $\frac{5}{0}$ part

The

Of Partition.

The proofe.

To deuide thys number 2345 by 6, the 6 is the diuisor, begyn your diuision at the leaft hand, as is sayd in the fyrst example, and set your diuysor vnder the thyrd figure 3, for yee maye not haue 6 out of 2, & therfore say how many tims 6 may ye haue in 23, 3, and 5 remaineth, set the 3 within the strike, and the diget 5 that remaineth set it ouer the seconde figure. and close the article 2 wyth a cypher o ouer it, and then strik out the diuisor wyth a dashe of your pen, and set your diuisor agayne vnder the thyrde figure 4, and then ioyne the artycle 5 to the diget 4 and it is 54, then see howe many tymes 6 ye may haue in 54, 9 and nothyng remayneth, sette thy 9 wythin the stryke, and close vppe the article 5 and the dyget 4 with a cipher o ouer

eyther

either of them, and strike out the dyuy-
sor with a dashe of your pen, and set the
diuisor vnder the fygure 5 and say: how
many times 6 may yee haue out of 5, no
tymes, therefore sette downe a cipher 0
wyth the stryke, and let the 5 stand, and
stryke out the dyuysor wyth a dashe of
your pen, and so the 6 parte of 2345, is
390, and the 5 that remayneth sette at
the ende of the quocient in this maner,

$\frac{5}{6}$ and so the quocient is 390 $\frac{5}{6}$

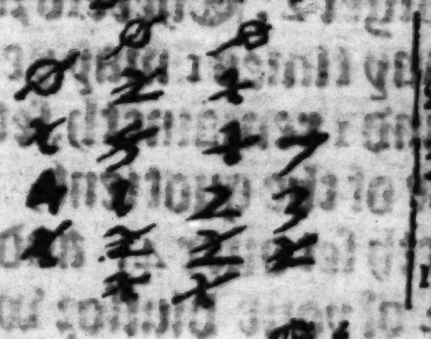
¶ To deuide 2 or 3 fygures,

or by as many as pleaseth you.

Fyrste set downe your number to be
deuided, and your dyuysor vnder it, be-
ginning at the leaft syde, at such a place
as ye maye take the leaft figure of your
deuisor in the last ende, and then se how
oft yee may haue that figure in ꝑ figure
aboue it, and that sette a part for your
quocient, wyth the whych quocient yee
shall multiplye euery figure by it selfe of

your

your diuisor and that ꝑ commeth of the multiplicatiō, ye shall abate of the figure right ouer it, putting out that other figure, and sette the rest aboue it, and so worke with euery figure by it selfe throughout the deuisor. Then renewe your diuisor 1 figure forwarde, towarde your right hand, as before is rehearsed and so cōtinue your woorke folowing to the fyrst figure of your number to be deuided. Then it is to be noted, that if it hap that your multiplied nūber that ye should abate, be more then the number ouer it, then for a generall rule ye shal not take your diuisor out of the figure aboue it, except that it may sufficiently yeld enough to all the abatements of the residue, as more plainly shall appeare in ꝑ example folowing.



Sum.

Of Partition.

Firſt ſet downe this number 4123, & deuide it by your diuiſor 12, begyn your worke at your leaſt hand, ſetting the article 1 of your diuiſor vnder 4 and the diget 2 vnder the third fygure 1; & then ſee how many tymes ỹ article 1 of your diuiſor ye may haue in the 4 ouer it, yee would ſaye 4 tymes 1, but that can not be, becauſe there yee may not haue the quotient 4 multiplyed with the dyget 2 of your diuiſor, for there of commeth 8, & then that 8 yee may not take out of 1 ouer the diget 2. Therefore ſay agayne: how many times 1 may yee haue in 4, 3 tymes and 1 remaineth, ſet the 3 within the ſtrike of the quotient, and the 1 that remaineth ſet ouer 4, and ſtrike out the article 2 of your diuiſor with your pen.

Then

Then multiply the quocient 3 wyth the diget 2 of your diuisor, and thereof commeth 6. Then soyne the article 1 that remayneth, and the diget 1, and it is 11, thereout take 6, and there remaineth 5, set the 5 ouer the thyrde fygure 1, & close vp the article 1 ouer 4 with a fygure ouer it, and strike out the diget 2 of your deuisor againe but one figure forward as thus: set the article 1 vnder the third figure 1 in the No. and the diget 2 vnder the second figure 2, and there se how many tymes 1 ye may haue in 5 that remayneth, 4 tymes and yet there remayneth 1 which must be set ouer 5, & strike out the article 1 wyth your penne. Then multyplye the dyget 2 of your deuysor with the quocyent 4, and it is 8, then soyne the article 1 that remayneth, and the dyget 2 in No. together, and it is 12, then take 8 out of 12 and there remayueth 4, set that 4 ouer the seconde fygure 2 in the No. and close vp ẏ artycle 1 with a cipher 0 ouer it. & strike out the

for he is not remoued nor blotted as ye other is, but standeth alwaye permanent on the leaft hand, directly agaynst the number that is to be deuyded. And iust ouer him ther standeth the remaine of the whole number, whych remayne cannot be deuided by the deuysor, and therefore it is set ouer the dyuysor permanet with a strike betwixt, as ye may see in the fyrst ensample, where 1 is remayning, and 6 is deuisor.

A	5	3	0	8	0	9	2	5	3
C	8	7	7	0	2	3	0		4
B	4	4	4	4	4	4	4		

For as muche as in this example yee cannot take 4 which is the dyuysor, out of 3, therefore yee shall sette 4 vnder 5, and saye howe many tymes 4 haue yee in 35, ye haue 8 tymes 4, and there resteth 3, yee shall sette the 8 betwyxte the two lynes, and the 3 aboue 5, then efface

the

the 5 and the 4, then ye shal set 4 vnder 0 and saye , in 30 howe manye tymes 4. 7 tymes, sette 7 betweene the lynes at the ryghte syde by the 8 , and there re-steth 2, whych yee shall set aboue 0, and efface 0, then set 4 vnder 8 and saye: in 28 how many tymes 4, 7 . and there re-steth nothyng, set 7 betweene the lynes by the 7, then set 4 vnder 0 , and saye howe many tymes 4 in 0, there is none, therefore set 0 betweene the lynes, then shall yee say in 9 howe manye tymes 4, 2 tymes, set than 2 betweene the lynes and resteth 1, whych ye shall set aboue 9 and efface 9, than say in 12 howe many tymes 4, 3 tymes, set than 3 betweene the lynes by 2, and ther resteth nothing Than in 3 which is ỹ laste fygure, howe many tymes 4, no tymes, therefore at the ende of the fygure yee shall set the 3 thus 3 and all is done.

4

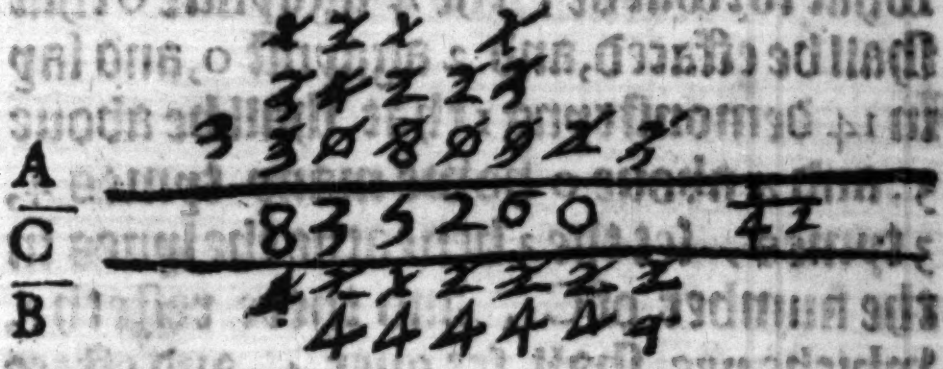
*An exmple,

			3	2		1			
A		3	5	0	8	0	9	2	3
C			8	7	7	2	3		4
B			4	0	0	0	0	0	
				4	4	4	4		

Example, when the diuisor is an article, it behoueth to do semblably, in saying: in 3 how many tymes 4, no times, and therfore we shall set 4 vnder 5, and 0 vnder 0, and say: how many tymes 4 in 35, 8 tymes, set 8 betweene the two lynes vnder 5. and ther resteth 3. whych ye shall set ouer 5. Then set the 3 that standeth ouer 5, and the 0 together, and that is 30, than say how many tymes 4 in 30, 7 and alwayes so to the end And then ye shall set 4 vnder 2, and 0 vnder 3, and say: in 12 in taking the 1 that shall rest of the summe before. and shall be aboue 9, and the 2 that is after 9. howe many times 4, 3 tymes 4, and then set 3 in the number of C, agaynst 2, & then shall ye ceale, for there remayneth all

onely

onely 3 to be parted by 40, now ye shall not make 0 vnder 3 as is afore, but at the ende ye shall set 3 thus $\frac{3}{40}$



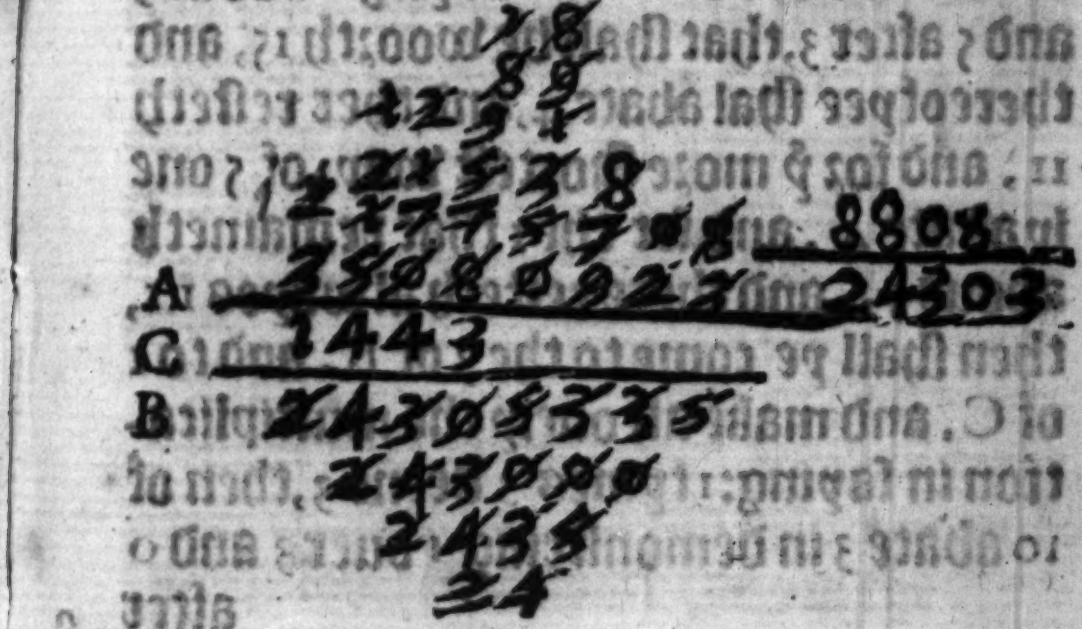
Example, when the diuysor is compost, as in this fygure afore, ye shall say. in 35 that be neare A how many times 4 that are in the nūmbee of B. 8 times 4 set that 8 betwene the two lynes in the place of C. and there resteth 3, which yee shal set aboue 5 and effate 35 of A, and 4 of B. then shall ye say in multiplying the 8 of C. by the seconde fygure of B. that is 2, ye shall say 2 tymes 8 bene 16. then abate 16 of ỹ number of A against the same 42, and there be 3 whych is ouer 5 ℈ 0 of the nūber, that be worth 30

and

and ye shall say: of 30 abate 19 and there resteth 14, of the whych 14 yee shall set 1 ouer 3 and efface 3, and 4 aboue 0 and efface 9, thē shall ye set the diuisor somwhat forwarde, the 4 agaynste 0 that shall be effaced, and 2 agaynst 0, and say in 14 demonstryng 1 that shall be aboue 3, and 4 aboue 0 howe many tymes 4, 3 tymes, set the 3 beneathe the lynes in the number of C. and there resteth 2, whiche yee shall set ouer 4, and efface 4. Then shall yee say agayne in multyplying the 3 of C. by the seconde figure of B. whych is 2, yee shall saye than: 2 tymes 3 is 6 and of that 8 is agaynst it, yee shall abate 6 and there shall reste 2, whyche yee shall set ouer 8 and efface 8, & aiwayes so vnto the ende. And when yee come to the two laste figures of A. and that yee woulde deuyde them by 42: yee may not, for the fyrst that is but 2 shal be effaced with 1 that standeth aboue 5, and because that yee maye take there nothyng: yee shall set 0 agaynste 2 of A.

of A. in the number of C, betweene the lynes, and so it is doone, and there shall resteth to bee deuyded by 42, and that 3 shall be set at the ende of the partycyon, and thus $\frac{3}{42}$, and it is finished.

And it is to be knowen, that as many figures as followeth the fyrste figure in the number of B. shall be multyplyed by them of the number of C. then the multiplication that thereof shall come, ye shall abate in the number of A. as in this example shall more plainly appeere.

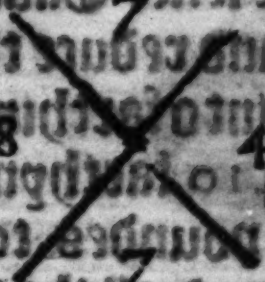


rition, and let the rest at the leafte ende of the Crosse semblably of the thyrde number that is betwene the two lynes, and let the rest at the right ende of the same Crosse, and if there bee nothyng rest, let a o Then multyplye the two numbers of figures, for they be digets that one by that other, and therof abate all the 9 s if there be nothing in the firste nũber, or if ye may not dyuide it, toyne it with the same that shall come there of. And so the rest that may not make 9, let it stande vnder the Crosse. Then shall ye come to the fyrst number, and semblably doo away the 9 there of, and let the rest aboue the Crosse, and if that aboue and that beneath be like, the partition is good, or if it be not, it is false. And for to vnderstand it better, we will make proofes by the ensamples before saide.

For the fyrste yee shall take the partitour which is 4, and set it at the leaft syde of the crosse, then shall yee abate

the

the 9 of the thyrde number, and there resteth 8, which 8 ye shal set at the right ende of the Crosse, and multiplye it by 4 and thereof commeth 32, whereof resteth 5, then adioyne them wyth the 2 farthynges that yee might not deuyde, and they shall make 7, the which 7 yee shall set vnder the crosse, than shall ye abate the 0 of the first number that beeth the farthynges, and there shall reste 7, whych 7 ye shall set at the vpper ende of the Crosse, and so the two endes be both a lyke, whych sheweth the proofe to be well and truly made.



The proofe

¶ The ende of Partition.

¶ The fyrst part called Reduction.

REduction is a kind of Algorisme, by the whych ye be taught to reduce numbers of lesse denominatiõ or value, to nũbers of more denomination or value, or if the case requyre it, numbers of great denomination to the numbers of lesse value. Example of the fyrst. 20.li.63.s.44.d.10.far. Thus reduce farthinges to pence, & the pence, to shyllinges, & the shillinges, to poundes and then thys summe is. 23.li.6.s.10.d and.2.far. So haue you reduced the lesse summe to the more. Example to reduce the more to the lesse. Take the same example againe, and reduce the.20.li.63.s.44.d.10.far. all into farthinges, and it wyll make 22410 farthynges, and it reductyng the poundes to shyllynges, then to pence, and all that pence to farthinges. Wherefore it shall be very necessary for you to know what thyng your number doth signifye, whether waight

money

money, measure, or tyme, and to be expert in all maner of accomptes: it shall be necessarie for you to knowe all maner of waights, coines, measures, and time. Example in English mony, 4 farthings make 1. d. 12. d. maketh a shilling, 20 shillinges maketh a pound.

In wayght, & fyrst of Troye waight, euery pound hath. 12. ounces, and euery ounce. 20. peny wayght, and euery peny wayght. 20. graynes, &c.

The haberdepeys pounde hath. 19. ounces, an ounce. 8. drammes, the dramme. 3. Scruples, the scruple. 20. graynes.

Of measure, the yarde hath. 3. foote, the foote hath, 12. ynches, the ynches 3 barley cornes of length.

Of tyme, the yeare hath. 3 6 5. dayes, the day. 24. houres, the houre hath 60. minutes, euery mynute 60. secondes, euery second 60. thyrdes, euery thyrde 60. quartes, euery quart. 60. fiftes, euery fift. 60. syxtes, and so forth infinitely

¶ To reducet he moze ſumme to the leſſe.

When thou woylt reduce the moze to the leſſe, looke howe many tymes the leſſe is contained in the moze, and by that number multiplye the number of the moze, and that that commeth of the multiplication, ſheweth the moze reduced to the leſſe, Example. I woulde reduce .8. pence to farthynges, looke how many tymes a farthyng is contayned in a penye, and that is as ye knowe 4 tymes, then multyplye accordyng to the rule 8 by 4. and that maketh 32. whych be 32 farthynges, and ſo 8.d. maketh 32 farthinges.

✣ An example.

Heere is a ſumme of .28. li. and .6. s. I would haue theſe poundes whych is of moze denomynation reduced to the ſhyllinges, whych be of leſſe denomination: then looke fyrſte howe olte a ſhylling is contayned in a pound, and that is .20. tymes, for 20. maketh a li. multiply

tiply then the 28 li. by 20, therof commeth 560, whyche be all shyllynges, to this put the other 6 shyllynges, and so all is 566 shyllynges.

But ye shall note, that where there be any summe of meane denomynacyons betweene the more to be reduced, and the lesse, to whome reduction is made: then shall it be easyer to reduce firste the more to the meane, and so by the meane to the lesse.

The example. 43. li. 19 s. 20. d. 4 farthinges, if ye will reduce all these sums to the farthynges: then shall it be better for you to reduce the poundes fyrste to shyllynges, and then beeing shyllynges to reduce them to pence, and at the laste to farthynges: so by your rule 43 pound maketh 860 shyllynges, to that adde the 19 shyllynges, it maketh 879, then reduce thys 879. shyllynges to pence: looke fyrste howe many pence are contayned in a shyllyng, and that is to multiply 879, by 12, & therof commeth 10548

which be all pence, to thys adde your 20 pence, & that maketh .10568.d. then reduce these pence to farthynges, see howe many farthynges be in a penye, ỹ is 4. multiply .10568. by .4. commeth to .42272. to these adde the 4 farthinges and that maketh .42276 farthynges. Thus haue yee reduced .43.li.19.s.20.d. 4 farthynges, the moze by the meane to the lesse.

¶ To reduce the lesse to the moze.

Fyrst marke howe manye tymes the moze dooth contayne the lesse, and by that number deuide the lesse, and the quocyent sheweth the lesse reduced to the moze. Example. I woulde haue thys summe 5600.s reduced into poundes. for howe manye tymes a pounde dooth contayne a shylyng, that is .20. tymes, then deuide .5600. by .20. the quocient shall be .280. which be poundes, so that .5600. s. reduced to poundes, maketh .280.li. and so lykewise in all other reckonynges.

When

Of Reduction,

When summes of diuers denominacions come in addition to be added together, then beginning at the summes of least denomination, adde them euer together, tyll such tyme as they make a number of the next denomination, and that that remayneth not able to make any number of greater denomination, set it vnder the lyne, and proceede to the next summe of greater denominatyon to the whyche adde the number of the same denomination reduced out of the summe before the lesse denominacion, so proceeding to the ende.

¶ An example.

li.	s	d.	far.
1680.	10.	5.	3.
8200.	29.	7.	2.
3008.	3	10.	3.

Begyn at the least whych be farthinges, saying: 3 and 2 bene 5, and 3 beene 8 these 8 farthinges make 2 pence, there-

fore take these pence and adde them to the next summe, whych is of the same denominacion, saying 2: and 10 be 12. d. whych is 1 shylling, the 7 and 5 be 12, whyche also maketh a shylling, so among these pence yet haue 2 shyllynges to be added to the nexte order of shyllynges, saying: 2 and 3 be 5, and 9. is 14, put the dyget 4 vnder the lyne, and reserue the article to the nexte place, saying: And 2 is 3, and 1 maketh 4, sette that 4 vnder the lyne also, and then is it 44 s. the whych reduced to pounde maketh 2. li. and 4 s. remayneth vnder the tyttle of shyllynges: then put to that 2. li. to the other pounds, and so haste thou doone in reductyon of the summes of lesse value to the greatest summe whych be pounds. And thys is sufficiently entreated of Reduction.

¶ The ende of Reduction.

¶ The seuenth parte called Progression.

PRogression sheweth the number when it begynneth at 1 or at 2, in mountyng alwayes by one, & one as dooth thys number 1 2 3 4 5 6 7 8 9. Now if ye will know the valour of the numbers, firste yee muste regarde two thinges, that is to wytte, if the number proceede continually without leauing any thyng betwixt as 1 2 3 4 5 6 7, or if it leue any thing betwixt as here 1 3 5 7 9. Secondly ye muste consider if the number be euen or odde. And after these two considerations, then be foure rules that here foloweth yee may knowe the valour of eche whole number.

The first rule is when one number proceedeth in mounting alwayes continually in the begynning, then if it ende in an euen number, then shall yee take the halfe of that euen number, and by it ye shall multyplye the odde number that cõmeth of the euen number, as yee may see in this example folowing.

An example.

1 2 3 4 5 6 7 8

4
9
36

If ye wyll knowe howe muche this number is woꝛth, then multiply the halfe of 8 that is 4, and the number that is after 8 is 9, and then thereof commeth 36, and so muche is the summe woꝛth, and thus maye yee doo with all such lyke questions.

An other example.

1 2 3 4 5 6 7

4
7
28

The proꝛe.

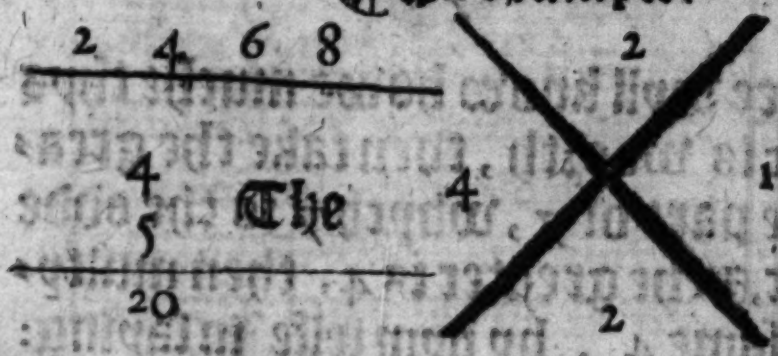
Foꝛ to multiply this number 7, wherein the greatest and the moꝛe halfe is 4 ye must multiplye 7 by 4, and it is 28, and so much is the whole summe.

The thirde is, if a number proceede

not

not continuallye, and ende in an euen number, yee shall take the halfe of the sayde number that is euen, and by hym multiplye the same that is nexte commyng after the same halfe, and in thys dooing yee shall haue the summe of the same number.

An example.



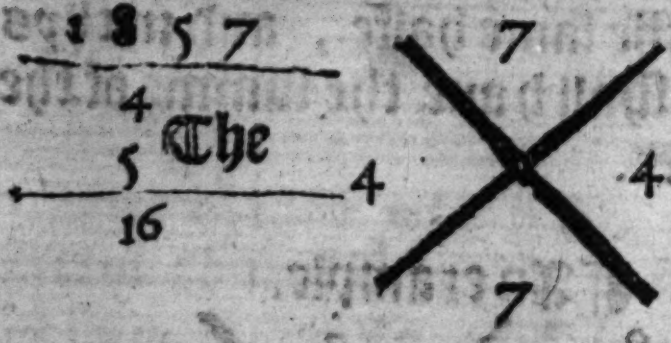
Yf yee wyll know howe muche thys number is worth, then take the halfe of 8, that is 4, then multiply by the 4 the number whych foloweth, that is 5 in saying: 4 times 5 is 20, & so much is worth the whole summe.

The fourth is whan the sayde number proceedeth not continually, then if it end in an odde number, yee shall take

the

the halfe of the sayde number that is odde, and multiply it by it selfe.

¶ An other example.



If yee wyll know howe muche thys number is wooꝛth, then take the greater halfe part of 7, whych 7 is the odde number, & the greater is 4, then multyply the same 4, by hym selfe in saying: 4 tymes 4 is 16, and so much is wooꝛth the sayd number. And thus may ye doo with any other such lyke questions.

Yet is there an other progression, and it is also a manner of duplycatyon, as heere after shall appeare.

1 2 4 8 16 32

Now if yee desyꝛe to make a summe of these, doo nothyng els but double the last

last figures, as 32 and 32 is 64, and ther of subtract 1, and there resteth 63, and that is the summe, and it is done.

¶ The end of Progression.

¶ The rules of fractions.

IN Fractyons there be two manner of nũbers, whereof the fyrste is called the Numerator, for hee sheweth the number of the denomynator that standeth vnder hym. The ather is called the denomynator, for hee sheweth euer howe much the part is, and standeth euer vnder the Numeratour, and yee may make betweene them both a lyne if it please you, as appeareth in these examples folowing.

Seuen by 9 parted, ye shall set thus $\frac{7}{9}$

And 1 by 2 parted thus $\frac{1}{2}$

And 1 by 4 parted thus $\frac{1}{4}$

Of fractions.

Of Numeration.

Numeration is the fyrste espeche and it is nothynge elle but that yee muste euer set the lesse summe aboue, and the moze summe vnderneath as by these examples folowynge is showed.

1	1	1	2	6	8	3	4	5	6	8	
2	5	9	3	7	10	4	6	9	8	14	

Of Addition.

If yee wyll adde two oz thzee, oz monre bzoken numbers togeather yee muste marke whether the numbers bee of one denomination as these $\frac{1}{3}$ and $\frac{1}{3}$ if they be all of one name, then adde them togeather, in saying: 1 and 2 is 3, set the 3 aboue 3, & that is 1 whole. Now adde $\frac{1}{5}$ $\frac{4}{5}$ and $\frac{3}{5}$ togeather, & set them thus $\frac{9}{5}$ they make 1 and $\frac{4}{5}$

Nowe wyll yee adde bzoken vneuen num-

numbers $\frac{2}{3}$ to $\frac{3}{4}$ then multiplye them crosse wyse and say: 3 tymes 3 is 9, and 2 tymes 4 is 8, adde that 8 to 6, and it is 17, then multiply the numbers together in saying: 3 tymes 4 is 12, set that 12 vnder 17, as thus $\frac{17}{12}$ that is 1 and $\frac{5}{12}$.

When there cõmeth moze broken numbers then two at once, as in this example, if you would adde $\frac{5}{4}$ $\frac{5}{6}$ to $\frac{4}{5}$ then make the 2 fyrst numbers after the rule afoze said, & it commeth to $\frac{14}{24}$. Nowe adde $\frac{38}{24}$ to $\frac{4}{5}$ and multiply them crosse wyse in saying 5 tymes 38 is 190, then 4 times 24 is 96 thereto adde 190 commeth to 286. set them aboue the lyne, then multiply 5 with 24 commeth 120, set them vnder the lyne, and they stand thus $\frac{286}{120}$ that is 2 and $\frac{4}{120}$. Now adde me $\frac{1}{5}$ and $\frac{3}{5}$ to $\frac{4}{7}$, then say: 2 tymes 3 is 6, & 5 times 1 is 5

1 is 5 adde them togeather, for the tellers, and set it aboue the lyne, then multiply the two numbers together in saying, 2 tymes 5 is 10, set that 10 vnder 11 as thus $\frac{11}{10}$. Now adde $\frac{11}{10}$ to $\frac{4}{7}$ multiply them crosse wyse, lyke as yee dyd in the example before, and yee shall haue $\frac{117}{70}$ $\frac{74}{76}$ whych is 1 and 76 and thus yee shall doo with all other.

Of Subtraction.

WIll you subtract a broken from broken, then yee muste marke whether the numbers of the same broken be lyke in denomynacyon or not, and if they be lyke of name, then euer subtract the lesse teller out of the more, and set the number vnder the teller. As for example, if yee will subtract $\frac{5}{1}$ from $\frac{7}{12}$ the subtract the vppermost 5 out of 7 and there resteth 2. sette that 2 aboue

aboue 12 as thus, $\frac{2}{12}$ that is $\frac{1}{6}$ but when there commeth broken & vneuen nũbers as these $\frac{2}{13}$ from $\frac{5}{9}$ then multiply bothe the nũbers together in saying 6 tymes 13 is 78. Then multiply crossewyse the numbers with the tellers in saying: 13 tymes 5 is 65 from 9 times 9 is 54, now subtract 54 from 65 and there resteth 11, that 11 set aboue 78 as thus $\frac{11}{78}$. Now wyl ye subtract $\frac{13}{34}$ from $\frac{24}{65}$ breake eche together and commeth to $\frac{13}{12}$ and $\frac{22}{15}$ then multiply the number in saying 15 times 12 is 180, then multiplye them crosse wise in saying 12 times 22 cõmeth 264 then say 15 times 13 cõmeth 195, now subtract this 195 from 264, & there resteth 69, which 69 set aboue 180, as thus $\frac{69}{180}$ and it is done.

$\frac{2}{6}$ frõ $\frac{1}{0}$ is $\frac{6}{39}$ $\frac{1}{3}$ from $\frac{1}{4}$ is $\frac{1}{12}$

¶ Of

Of Multiplication,

If yee wyll multiply $7\frac{6}{7}$ with $16\frac{13}{16}$ the̅ multiplye the vppermoſt fygures togeather in ſaying: 6 times 13 is 78, then multiply the neather moſt togetner, in ſaying: 7 tymes 16 is 112. the wheych yee ſhall ſet thus $\frac{87}{112}$ that is $\frac{30}{56}$. Now wil ye multiply broken wyth the whole: as $\frac{2}{5}$ with $\frac{6}{1}$ then ſaye: 2 tymes 6 is 12. and 5 times 1 is 5, ſet them thus $\frac{12}{5}$. And whē that the vppermoſte number is more then ỹ neathermoſt, then ye ſhall deuyde it with the neathermoſt, and that ỹ commeth therof is the whole, as thus: deuide 2 wyth 5 cōmeth 2 hole & $\frac{2}{}$. Now wil ye multiply the whole and 5 broken w̄ the broken as $7\frac{5}{4}$ w̄ $\frac{5}{8}$ then multiply them with. 7 commeth 28, & ad 3 therto cōmeth $\frac{13}{4}$ Now we make it after the fyrſt rule in ſaying: 5 tymes 31 is 155, & 4 tymes 8 is 32: ſet them thus $\frac{155}{32}$ that maketh $4\frac{27}{34}$ and it is done.

1 and

$\frac{1}{1}$ and $\frac{1}{4}$ is $\frac{1}{12}$ $\frac{2}{3}$ and $\frac{6}{0}$ is $\frac{12}{24}$

Of Diuision.

The number that ye wyll deuide sette euer at the least hand, & that ye wyll deuide wyth all, sette at the right hand. As when ye will deuide $\frac{4}{15}$ with $\frac{2}{3}$ And ye shall multiplye the broken crosswise in saying: 3 times 4 is 12, ỹ is the whole that ye will deuide, then multiply 5 w̃ 2 commeth 10, that is $\frac{12}{10}$ maketh 1 $\frac{2}{10}$ And when that ye will deuide broken wyth whole, as $\frac{5}{7}$ with 4, then set your fraction and whole thus $3\ \frac{4}{7}\ 1$ nowe multyply 1 wyth 3 that is the whole whiche must be deuided, then multiply 4 wyth 7, and it maketh 28, which must be set thus $\frac{3}{18}$ and it is done, But if ye may deuide the teller iust with the whole, that were lyghter, as $\frac{18}{19}$ in 6 whole, therfore

deuide 18 is 6 maketh 3, the whyche yee shall set thus $\frac{3}{18}$. Nowe will ye knowe what broken of broken is, as $\frac{2}{3}$ of $\frac{3}{4}$

Fyrst ye shal multiply the vppermost fygures one wyth an other sayinge: 2 tymes 3 is 6, and then the vppermoste in sayinge: 3 tymes 4 is 12, that maketh $\frac{6}{12}$ that is $\frac{1}{2}$. Item $\frac{6}{7}$ of 128 $\frac{2}{3}$ multiply 128 wyth 3 and adde there 2, commeth 386 whych set thus $\frac{386}{3}$, then multiplye them wyth 6 commeth to 2326, then multiplye the vndermoste altogether sayinge: 3 tymes 7 is 21. and 2 tymes 21 is 42, therwyth deuide 2316, and it is done.

The ende of the rule of Fractions.

A Table very neceſſarie for Multiplication.

1	times	1	maketh	1			
2		2		4			
3		3		9			
4		4		16			
5		5		25			
6		6		36			
7		7		49			
8		8		64			
9		9		81			
10		10		100			
2	times	3	makes	6			
2		4		8			
2		5		10			
2		6		12			
2		7		14			
2		8		16			
2		9		18			
2		10		20			
3	times	4	makes	12			
3		5		15			
3		6		18			
3		7		21			
3		8		24			
3		9		27			
3		10		30			
4	times	5	makes	20			
4		6		24			
4		7		28			
4		8		32			
4		9		36			
4		10		40			
5	times	6	maketh	30			
5		7		35			
5		8		40			
5		9		45			
5		10		50			
6	times	7	makes	42			
6		8		48			
6		9		54			
6		10		60			
7	times	8	makes	56			
7		9		63			

The Table

7 10 70
8 times 9 makes 72
8 10 80
9 times 10 make 90
1 times 11 makes 11
2 11 22
3 11 33
4 44
5 55
6 66
7 77
8 88
9 99
10 110
1 times 12 makes 12
2 12 24
3 36
4 48
5 60
6 72
7 12 84
8 96
9 107
10 120
1 times 13 makes 13
2 26
3 39
4 52
5 65
6 13 78
7 91
8 104
9 117
10 130
1 times 14 makes 14
2 28
3 42
4 56
5 75
6 14 84
7 90
8 112
9 126
10 140
1 times 15 makes 15
2 30
3 45
4 60
5 75
6 15 90
7 105
8 120
9 135
10 250

1 times

1 times 16 makes 16
2 32
3 48
4 64
5 80
6 96
7 112
8 128
9 144
10 160

1 times 17 make 17
2 34
3 51
4 68
5 85
6 102
7 119
8 136
9 153
10 170

1 times 18 makes 18
2 36
3 54
4 72
5 90
6 108
7 126
8 144
9 162
10 180

1 times 19 makes 19
2 38
3 57
4 76
5 95
6 114
7 133
8 122
9 171
10 190

1 times 21 makes 21
2 42
3 63
4 84
5 105
6 126
7 147
8 168

		18	9		72
		20	10		96
11 times	22	makes	22	5	120
			44	6	144
			68	7	168
			88	8	192
			110	9	216
	22		132	10	240
			154	11 times	25 makes 25
			176	2	050
			198	3	75
			230	4	100
12 times	23	makes	238		125
			46	6	25 150
			69	7	175
			92	8	200
			115	9	225
	23		138	10	250
			161	11 times	26 makes 26
			194	2	052
			207	3	78
	12		230	4	104
13 tims	24	makes	245		130
			48	6	26 156

7		182
8		208
9		234
10		260
1	times 27	makes 27
2		54
3		81
4		108
5		135
6	27	162
7		189
8		216
9		245
10		270
1	times 28	makes 28
2		56
3		84
4		112
5		140
6	28	168
7		196
8		224
9		252
10		280
1	times 29	makes 29
2		58
3		87
4		116
5	29	145
6		174
7		203
8		222
9		261
10		290
1	times 31	makes 31
2		62
3		93
4		124
5		155
6	31	186
7		217
8		248
9		279
10		310
1	times 32	makes 32
2		64
3		96
4		128
5		160
6		192
7	32	224
8		256
9		288
10		320

The Table

1	times 33	makes	33
2			66
3			99
4			132
5			165
6	33		198
7			231
8			264
9			297
10			330
1	times 34	makes	34
2			68
3			102
4			136
5			170
6	34		204
7			238
8			272
9			306
10			340
1	times 35	makes	35
2	35		70
3			105
4			140
5			175
6			210
7	35		245
8			280
9			315
10			350
1	times 36	makes	36
2			72
3			108
4			144
5			180
6	36		216
7			252
8			288
9			324
10			360
1	times 37	makes	37
2			74
3			111
4			148
5			185
6			222
7	37		259
8			296
9			333
10			370
1	times 38	makes	38
2			76
3			114
4			152

5	38	190
6		228
7		266
8	38	304
9		342
10		380
1 times	39 makes	39
2		78
3		117
4		156
5	39	195
6		234
7		275
8	39	312
9		352
10		390
11 times	11 make	121
12	12	144
13	13	169
14	14	195
15	15	225
16	16	256
17	17	289
18	18	324
19	19	361
21 times	12 mak.	441
22	22	484
23	23	529
24	24	576
25	25	625
26	26	676
27	27	729
28	28	784
29	29	841
31 times	31 make	961
32	32	1024
33	33	1089
34	34	1156
35	35	1225
36	36	1296
37	37	1396
38	38	1444
39	39	1529
41 time	41 mak.	1681
42	42	1764
43	43	1849
44	44	1936
45	45	2205
46	46	2119
47	47	2209
48	48	2304
49	49	2401
51 times	51 mak.	2601
52	52	2704

53	53	2809
54	54	2916
55	55	3035
56	56	3136
57	57	3249
58	58	3364
59	59	3481
61 times	61 mak.	3721
62	62	3844
63	63	3969
64	64	4096
65	65	4225
66	66	4256
67	67	4489
68	68	4924
69	69	4761
71 time	71 mak.	5041
72	72	5148
73	73	5329
74	74	5476
75	75	5625
76	76	5776
77	77	5929
78	78	6084
79	79	6241
81 time	81 make	6561
82	82	6724
83	83	6889
84	84	7056
85	85	7225
86	86	7396
87	87	7566
88	88	7744
89	89	7921
91 time	91 make	8282
92	92	8464
93	93	8649
94	94	8836
95	95	9025
96	96	9216
97	97	9405
98	98	9604
99	99	9803

The ende of the Table for Multiplication.

¶ Heere

Cheere foloweth the Rules, and fyrst the rule of three.

Multiply by the contrary & deuid by the semblaunt or lyke. Thys rule may be vnderstand in two maners. Fyrst multiplye the same that ye wyll buy by his contrarye, that is to wit by the price, and deuide by the semblant, that is to wyt, by as much as ye haue bought, or thus: Multyplye the price by his contrary, that is to witte, by the same that thou wilt buie, and deuide it by hys semblant, that is that same that ye haue bought. And note ye why it is called the rule of three, for wyth three numbers certaine yee may knowe and fynde the fourthe number, vncertayne. And it is a rule ryghte notable and necessary in the fact of marchaundise. For to haue knowledge of this rule, it behoueth to set some rules different in manner of questions, & first in measures long.

The rule of whole numbers,

If 9 elles of cloath coste 25 crownes, how

how much shal cost 15 by the pryce? Answer: It behoueth you to set the sum, that is to wyt 23. crownes. And than ye shal multiply by hys contrarye, that is to wit, by 15, that is 375. & then deuid them by that semblant, that is to witte by 9, & thereof commeth 41 crownes & an halfe, and there remaineth 1 crowne and an halfe, the whych yet shall make in. s. and ther be 54. s. the which ye shal deuide by 9, and there of commeth 6. fr. Therefore ye may answer that the 15. elles shal cost 41 crownes and an halfe and 6 fr. Now if ye wil make the prefe, it behoueth you to forme your question thus: If. 15. elles cost 41 crownes and an halfe and 6 shillinges, howe muche shall cost 9 elles by the price. Then it behoueth you fyrst to multiply the 6. s. by 9. and that is. 54, then it behoueth you to make thereof crownes; that is one crowne and an halfe, and then ye shall multiply the. 41. crownes and an halfe by 9, and they ben 373. crownes and an

halfe

halfe, and then set thereto 1 crowne and an halfe, & they be 375. crownes, which yee shall deuide by. 15. that beene. 25. the which. 25. is the price of 9 elles, and so the rule is good. And thus you may do with all other lykewise.

¶ The seconde rule of whole number, with numbers broken semblable.

If. 10. elles & 2 thirde partes of cloth cost. 35. franc, how muche shall cost. 14. elles by the price? Answer. For to know this rule and other semblable, it behoueth you to reduce the elles bought, & them that ye wyll bye all into thirdes, because of them that be brought, in saying thus: 3 times 10 is 30, and set thereto 2 thyrdes, that is than. 32. thyrdes. Then it behoueth you to make deuysyon by. 32. and than yee shall reduce the 14. elles into 1 thyrd, in saying 3 tymes 14 is 42. Then. 42 shalbe the multyplycatour. Now set the summe, that is to

wyt

wyt 35 franc. the which multiplied by 42, be 1470, the whyche deuyded by 32 thereof commeth 45 franc. and an halfe, and there resteth 14 franc. the which ye shall reduce to shillinges, & than deuide them by 32, & thereof commeth 8. s. & an halfe, and than shall yee make them in pence, and deuide them by 32, and thereof commeth 3 pence, therefore ye maye answer that the 14 elles of cloath shall cost 45 francz and an halfe: 8 shyllinges and an halfe and 3 pence.

For to make the proofe, it behoueth you to make your woorke by the contrary, for it behoueth you to multiplye the summe that the 14 elles coste by the deuisor, and deuide it by the multyplycatour. Therefore set the summe vpon the left syde, and fyrst multiply the 3. d. by 32 and whan they be multiplied, yee shall make of them shillinges, and then ye shall multiply the 8. s. and the halfe by 32. and then make thereof francz And then yee shall multyplye the 45.

francz

francz, and the halfe by 32, and deuyde them by 42, and so ye shall know if the rule be well made.

The third rule of whole numbers with diuers minutes.

If 4 elles and 2 thirdes of cloath cost 10 crownes, how much shall cost 6 elles & 2 quarters by the price? For to know this rule, it behoueth you fyrste to reduce the 4 elles and 2 thyrdes thus, 3 tymes 4 is 12. And than ye shal adioine the 2 thyrdes, and than it is 14. & then the elles that ye will buy, ye shall reduce them into one fourth thus: 4 tymes 6 is 24, And then set the 2 quarters therto, and than there is 26 quarters. And than ye shall multiply that one by that other, that is to witte the numbrant of the fyrste by the denominant of the second, in saying: 4 tymes 14 is 56. And that 56 shall be the deuisor. Then multiply the numbrant of the secõd, by the deno-

denominant of the fyrste, in sayinge. 3 times 26. is. 78. and that 78. shalbe the multiplicatour. And therefore set. 10. crownes and multiplye them by. 78. & deuide them by. 57. and yee shall fynde that the. 6 elles and 2, quarters cost. 13. crownes and an halfe. 15. shyllinges & 5 pence. And there resteth, 8.

✠ The example.

Deuisor.			M.
59	142	242	78
10 crownes	146	2.	
	3	4	

If 4 elles 2/3 cost 10. crownes, 6. elles 2/4 shal cost. 13. crownes and an halfe. 15. shyllynges. 5. pence, there resteth 8.

For to make the proofe, it behoueth you to worke the contrarye, you muste multiply the sum by the diuisor that is to wyt, by 59. and make diuision by the multiplicatour, that is to wyt by. 78 & ye shall fynde. 10, other wyse if there be more or lesse, the rules be false.

¶ The

The fourthe rule containing whole numbers to the marchandise that ye haue bought, and minutes to the same that ye will buie.

If 8 ells of cloth cost 15 crownes, how much shall cost 24 quarters by the price. For to know this rule, yee must reduce the 8 ells into quarters, in saying: 4 times 8. is 32, then 32 shall be the diuisor, and the 24 quarters shall be the multiplicator. Now set the 15 crownes and multiply them by 24 quarters, and deuide by 32, and ye shall finde that the 24 quarters cost 18 crownes, & the halfe 15 shillings and an halfe 3 pence. For to make the proofe ye must worke the contrary, for ye shall multiplye the sum that the 24 quarters cost, that is to wyt 18 crownes, & the halfe 15 s. and an halfe 3 pence by 32, and deuide them by 24.

The rule of round measures that is to wyt, measure of corne, of wine, and of oyle.

The Rules.

First it behoueth you to presuppose and know the measures of corne.

One is worth 12 septiers.
One septier is woorth 4 minotes.
One mynot is woorth 3 bushels.
One bushell is woorth 4 quarters.

¶ The measures of wine.

One muy of wyne holdeth 36 septiers.
The septier holdeth 4 quartes.
The quart holdeth 2 pyntes.
The pynte holdeth 2 choppynes.
The choppyne 2 halfe septiers.
The halfe septier 2 possions.

¶ The fyrst rule.

If the muy of corne cost 19 franckes, how much is worth the bushell. Aunswer. For to knowe this rule, ye must know how many bushels is in 1 muy. Therefore multiply the muy by 12, and than by 4, and than by 3, whych commeth to 144 bushels, the whych shall be the deuisor of 10 francz, therfore deuide 10 by 144. And thereof commeth 1.s.4.d. and an halfe, resteth 24. pence

There-

Therefore the bushell costeth. 1. s. 4. d and an halfe, resteth 24. d.

¶ The second rule.

To the contrary, if the bushell cost 1 s. how much shall cost a thousand and 4 hundreth muys by the price. Answer. For to knowe thys rule, it behoueth you to make all the Muys in bushels. And there be 201600 bushels, ẏ which it behoueth you to multiplye by 2, and there be 403200, and of them ye shall make crownes. Therefore deuide by 36 and there been 1200 crownes. Therefore ye may answer, that if the bushell cost 2. s. a thousande and 4. hundreth muys shall cost a leuen thousande, and 2 hundreth crownes, and thus ye may doo of all other semblable.

¶ The thyrd rule.

If the septier of corne be woorth 1 fz & the loafe of peny torneys wayght 12 ounces, how much ought it to weygh when the septier is woorth 15 torneys. Answer. Multiply ẏ first nūber by the

seconde, that is to wyt, 20 by 12 and deuide it by 15, and ye shall hynde that it ought to weygh 16 ounces. And thus ye may do of all other lyke.

If the muy of wyne be wozth 12 francz, how muche ought the pynte to be wozth. Aunswere. Foz to knowe this question, it behoueth you to reduce the 12 muys into septiers, from septyers into quarters, and from quarters into pyntes, and they be 288 pyntes. And than ye shal reduce the 12 francz into os. that is 240, and that into pence, that bene 2880 pence, the whych behoueth you to deuide by 288, and it commeth to 10.d. Therefoze if the muy of wyne rost 12 francz, the pynte is wozth 10.d. But it is requisite that the Tauerner haue some gaynes. If he sell 12.d. the pynte, I demaunde how much shall he win vpon the muy. Answer. He selleth it 2.d. moze then it is wozth, therefoze multiply 288 pyntes by 2, and they be 576, the whyche ye may deuyde by 12.

and there shalbe 48.s. Therefore may ye aunswer that he getteth 48.s. vpon the muy.

If the muy cost 10 francz, how much is woorth the pynte. Aunswer. It behoueth you to doo as is aboue sayde, and ye shall fynde that it is woorth .8. pence and one third.

If the pynte cost 6 pence, how much shal cost 12 muys by the prece. Aunswer: It behoueth you to know how many pyntes be in a muy, that is 288, multyply 12 muys by 288, that is 3456 pints. And than multiplye the pintes by 6, that is 20736, which summe ye shall make .s. by deuision, and there beene 1036 28.s. of shyllinges ye shall make francz. Therefore ye shall make deuision by 26, yee shall fynde 86 francz. 8. s. Therefore ye may aunswer that the 12. muys shall cost 86 francz. 8. s.

In so muche as competentlye we haue treated of the rule of three in the layet of measures, it is ex-

pedient that we create therfor in the kayet of weight.

If an hundreth pounde of pepper cost 20. s. how much shall cost 6 pound by the price. Aunswer. For to knowe this question, ye must multiplye by the contrarie, and deuide by the semblant, that is to wyt, multiply by 6 and deuide by 10, and ye shall finde that the 6 pounde shall cost 1 franc and 4. s. To make the proofe ye must multiplye by 100, and deuide by 6. Now I demaũd if the 6 pounde cost 1 franc 4 s. howe muche is woorthe the ounce. For to knowe this ye shall make the pounde in ounces, the whych bene 96 ounces, and then make the money in pence the which been 288. d. the which ye shal deuide by 96, and thereof cõmeth 3 pence, therefore the ounce shall cost 3 pence.

If one pound of Saffron cost 3 franc, and an halfe, how much is woorth the ounce? Aunswer. It behooueth you to knowe that in a pounde is 16 ounces, ther-

therfore deuide the 3 francz & the halfe by 16, and ye shall fynde that the ounce is woorth 4.s.4.d. and an halfe, and thus ye may doo of other lyke.

If 4 pounde of saffron coste 16 franc. 6.s.8.d. how muche shall coste 3 quarterns by the price? For to knowe thys rule, ye shall reduce the 4.l. into thirds & shall say 3 tymes 4 is 12, and 1 thyrd bene 14, then ye shall multiply by 4, and shall say: 4 tymes 14 been 56 the deuysor. then for the seconde number yee shal say: 3 times 3 is 9 fourthes or quarters, the which 9 shalbe the multiplier. Nowe set the 16 francz 6.s.8.d. tournois, & multiply them by 6 and deuide them by 16, & thereof cõmeth 2 franc. & an halfe. 2.s.6.d. Therefore ye may answer that the 3 quarterns shall coste 2 franc. & an halfe 2.s.6.d. For to make the proofe, ye must worke by ỹ contrary in multiplying by the deuisor, that is to wyt by 56, & make diuision by 9, and so ye may doo of other semblable.

If one pounde of tyn cost 9 blances, how many hundreth shall I haue for a thousand and 4 hundreth franc. It behooueth you to know how muche is woorth the hundreth by 9 blances the pound. And ye shall finde that there is 12 franc. and an halfe. Now make deuision of 1400 frances by 12 frances and an halfe, ye shall finde 112. Therefore ye may say that I shall haue 112 pound of tyn for 1400 frances. And also as ye haue made this rule, ye may doo in all other marchandises, as in leade, yron, spices, pepper, suger. And as ye haue done of poundes, ye may doo of quarterns, ounces, and all other weyghtes.

¶ A rule without time.

Three Marchauntes put theyr money together for to haue gaynes, the which haue bought such marchaundise as hath cost 125 franc. whereof the first hath laid 25 francz. The second 64 s. and the thirde. 36, s. And they haue gotten

gotten 54 franc. of cleare gaines. I demaund how shal they deuide it, so that eche man haue gaines according to the money that he hath layd downe. Answer. In all suche rules and questions ye shall multiply eche one after the money that he had layd, therefore multiply the gaines for the fyrst by 25, & deuide by 125, that is the diuisor common. For the second, multiply the gaynes by 64. and deuide by 125 the diuisor common. And for the thyrd, multiply the gaynes by 36, and deuide by 125 the diuisor cõmon. And for to fynde the diuisor common, ye shall set together the multiplicatours, that is to wyt 25, 64, and 36, which is 125 the diuisor common. And so shall ye doo in all rules of company. Now ye may finde & knowe how much eche one hath of gaynes, and ye maye see it by the example here present.

The first hath 10 fr and halfe 2 s. The seconde hath 27 franc. and halfe. 2. s. and halfe 5. d and half, resteth 2. d. and

halfe

halfe. The thirde hath 15 franc. and an halfe 5. s. resteth 0 pence.

256436. 125.

Multiplicatours. Diuisor.

And they haue yet to be deuyded among them of restes 62. d. & an halfe.

For to make the proofe, it behoueth you to deuide the restes, and then reduce altogethers, and ye shall finde the sum deuided, for all the rules of company ben prooued by addicion of sums.

The second rule of whole tyme.

If Dure Marchauntes laye money together for wynning for a certayne tyme, of whō the fyrst hath layd 10 fr. for 2 yeare. The seconde 20. fr for 3 yeare. The third 160 fran. for one yeare. And the fourth hath layde 40. fr for 4 yeare, and they haue gained 454 fran. I demaund how muche eche one ought to haue of winning after the money that ye hath layde, and after the tyme

tyme that he hath holden hys money in gayne for company. Answer. For to knowe this rule and other semblable, ye shall multiply the money that eche one hath laid by the time that he hath holden it in company. Example. The fyrst hath laid 10 fran. for 2 years, therfore it behoueth you to multiply 10 by 2 in saying: 2 times 10 is 20. For the second 3 times 20 is 60, For the thyrd 1 tyme 100 is an 100. For the fourthe 4 tymes 40 is 160, and then it behoueth you to finde a diuisor cõmon, for eche hath his multiplicator, that is to wyt, the same that he hath layde, and for to finde it ye shall set together all the multiplicatours, that is to wyt, the 20, 60, 100, 160, the which maketh 340 therefore these 340 shall be the diuisor common to all, then howe muche eche one ought to haue ye may see by the example here following 454 s.

The first hath 26 franc. and halfe 4 s. one peny, reketh 140. D.

¶ The seconde hath 80 frances. 2.s. 4.d rest 80 pence.

The thyrde hath 134 frances. 11.s. 5 pence, rest. 20. pence.

The fourth hath 313 franc. & an halfe 2.s. and an halfe. 5.d. rest 100 pence.

20. 60. 100. 160. 340

Multiplicatours. Diuisor.

Of rest they haue to deuide one peny.

¶ The rule of company, Wher as is whole tyme, and partes of tyme.

Thyree Marchauntes laye money in companye for to haue gaynes therby, of whome the fyrste hathe layde 30 franckes for two yeares. The seconde hath layde 40 franc. for one yeare and thyree monthes. And the thirde hath layd 60 franc. for thyree yeaves and two monethes. And they haue gained with this money 44. franckes. I demaund how they shall deuide it, to the end that ech one haue his right after the money

and

and the tyme that they haue set a hol-den for to gayne. Aunswere. For thys rule & all other semblabe, ye shall multiplye the tyme by the money, as wee haue sayd aboue. But for as muche as there be monthes, ye must set and reduce all the tyme of eche one in monethes, and also if there were any dayes, ye should set al the tyme in dayes. The first hath layd 30 frauces for 2 yeares, in 2 yeares is 24 monthes, therefore multiplye 30 by 24, there beene 720. and this 720 shall be the multiplycatour of the first. The seconde hath layd 40 frā-ces for 1 yeard and 3 monthes, in one yeare beene 12 monethes, and 3 dooth make 15 monethes, multipiy 40 by 15, they make 600, which is the multyplicatour of the seconde. The thirde hath layd 60 franc for 3 yeares and two mo nethes, in 3 yeares is 36 monethes, & maketh 38 monethes. Now multyply 60 by 38 and they be 2280. which shall be the multiplicator of the thyrd. Now

for

for to haue a deuisor common; ye shall set together all the multyplycatours, that is 3600 the diuisor common. They haue to deuide 44 frances. The fyrste hath 8 francz, and halfe 6.s. rest 0. The second hath 7 frances 6.s. and halfe, reste 0. Thyrde hath 27 frances and halfe 7.fz 4 pence rest 0.

720.600.2286. 3600.

Multiplicatours. Diuisor.

¶ A rule of diuers fyluer, and diuers tyme.

Thyree Marchauntes haue made company togeather, of whome the fyrst hath layd 10 franc. 4. thyllynges for 2 monethes. The second hath layde 8 franc. for one yeare. And the thyrde hath laid 6 fran. 7. s. for 8 monethes, & they haue gotten of this money 24 fra. Now they shall deuyde it after the money & after this tyme I demaund. Answer. For to knowe thys rule and all other semblable, it behoueth you to re-

duce

duce the money of euery man into shillings. And all the tyme in monethes, And then multiply the money by the tyme. Example. The fyrst hath layde 19 frances, that is 200. s. and 4 is 204. the whiche shall multiply by 2 monethes, and they shall be 408 the multyplicatour of the fyrst. The second hath layd 15 franc. for one yeare and in 15. frs bene 300. s. and in one yeare is 12 monethes, therfore multiplye 300 by 12, and ther shall bee 3600 the multyplicatour of the seconde. The thyrde hath layd 6 franc 7 shillynges, and in 6 fran. is 120. s. and 7 bene 127. s. for 8 monethes, therefore multiplie 127 by 8, & they shal be 1016 the multiplicatour of the thyrd. And for to haue the deuisor common, ye must reduce together all the multiplicatours, and that shall bee the deuisor common, as ye may see by the example following. They haue 24 frances of winning.

The fyrst hath 2 franc. and halfe 8. s.

and

and halfe .5. pence, and halfe, resteth 360 pence.

The second shall haue 17 franc. 3. s. and halfe d. resteth 1952. pence.

The third shal haue 4 franc, & halfe, 7. s. 9 pence, & halfe resteth 1116. pence.

4. 98. 3600. 1016. 1684.

Multiplicatours. Diuisor.

And .d. is to deuide of the restes.

For to make the proofe, ye shall reduce together the three summes that they haue had: And if there be more or lesse the rule is euyl made.

The rule of company of Factours with Marchaunts & their Seruauntes.

Of this rule of Factours ye maye make 3 rules In maner of questions that fall among Marchaunts.

Example. 8 Marchaunts 3 Factors, and 5 Seruauntes or Varlets haue made company together, & haue cleare wyn gotten 1500 franc. wherof the Factours

tours ought to haue the halfe of the Marchauntes, & the Seruauntes the third part of the Factours, howe shall they deuide these 150 frank. Aunswer. For all such rules and questions, it behoueth you to fynde a number wherein is an halfe and a third, and that shall be 6 and this 6 shall be for the Marchant. And the halfe of 6 is 3, that shall be for the Factours, and the thyrd part of the Factours is 1, which shalbe for the seruauntes. And then yee shall multiplye the one by the other, that is to wyt, the personages by theyr number, 6 tymes 8 is 48, and this 48 shall be the multiplicacor of the Marchantes. And then there is 5 Factours, that haue 3, and 3 tymes 5 is 15, and then there be 3 Seruauntes that haue 1, and 1 tymes 3 is 3 and therfore the Factours shall yee multiply by 15, and the Seruauntes by 3. Now for to fynde the Dyuysor common yee shall set together all the multiplycatours, that is to wyt, 48. 15. 3. which be

66, these 66 shalbe the deuisor common Example, they haue to deuide 150. franc. The Marchauntes haue 109 fran. 1. s. and halfe 3. d. and halfe, resteth 12. d.

The Factours haue 34 franc. 1. s. and halfe 3. d. and halfe, resteth 21. d.

The Seruauntes haue 6 franc. and halfe 6. s. 4. d. rest 24. pence.

48. 15. 3. 66

Multiplicatours. Diuisor.

They haue to deuide 1 peny of restes.

For to make the proofe, ye shal deuide all the restes by the diuisor common. And then ye shall reduce altogether, for to haue 150 francs.

¶ The Rule of Factours, the which got the halfe of the gaine and of the principall.

An other rule in manner of a questyon. A Marchaunt hath giuen 50 franc. to his Factour, by such couenant that he gouerne them for tenne yeares. And at

at the ende of the tyme, that is to wytte at the ende of ten yeares they shall deuide the gayne and the pryncipall. It happeneth that the Factour wyll goe his waye at the end of 6 yeares, and he findeth that he hath gayned a thousand fran. I demaund how ought the sayde Factour to be payde, and howe muche ought the sayd Marchant to haue? Answer. Ye ought to regard how muche he should haue gained in those 10 yeres that he shoulde haue holden them in gayne as he had promised. Therefore ye maye forme the question: if 6 haue gotten a thousand, how muche shall be the gaynes of 10. Multiply 1000 by 10 and deuyde by 6, and ye shall synde that he should haue gotten 1666 franc. and an halfe 3.s.2. pence. Of the whyche gaynes the Marchaunt ought to haue the halfe, that is 833 franc.6. shillinges and halfe and 1 penye. And than take vp those 833 franc.6. shyllynges & halfe 1 peny of 1000 fran. that he hath gayned

and there remayneth 166 franc. 13 shyllinges 5 pence for the Factour. Nowe ye may aunswer that the Marchaunt shall haue of the gaines 833 franc. 6 shyllinges, and halfe 18. And one halfe of the principall, that is to wyt of 50. that is 25, and there be 858 franc. 6. s. & halfe 1. d. And the Factour shall haue of gaine [illegible]. 13. s. 5. pence. And of the principall 25 that is 161 franc. 13. s. 5. d. And thus may ye do of all other semblable. And it is proued by the reduction of the two summes gained.

¶ The third rule of Factours with couenauntes, that the Factour shall gaine the halfe of the principall.

An other rule of compante of Factours & Marchauntes, which couenant that the Factours shall goyne the halfe of the principall, and not of the gayne. Exampie. A Marchaunt gyueth vnto hys Factour 400 franc. that he shall gouerne

gouerne them foꝛ 6 yeares, and at the end of the tyme the halfe of the pꝛincipall shall be to the Factour. It happeneth the Factour wyll goe his waye at the ende of 2 yeares, and hath gayned 200 franc. I demaund how ought the Factour to be paid? Aunswer. Ye ought to regard howe much he shoulde haue gayned if he had serued all hys tyme, & foꝛ to finde it ye may woꝛke by the rule of thꝛee, foꝛ yee must multiplye by hys contrary, that is to wyt by 6, & deuyde by his semblant, that is by 2, in saying if 2 haue gayned 200 franc: how much shal 9 gayne? Ye shall finde ỹ he should haue gotten 900 franc. and he gayned but 200 franc. Wherefoꝛe he ought to make agayne 400 franc. to the Marchaunt, and he ought to haue the halfe of the pꝛincipall, that is 200 frances, therefoꝛe he oweth 200. vnto the Marchaunt, and so he hath loste all his time and 200. franc. of aduauntage, foꝛ the Marchaunt ought nothing to lose like

as he had accomplished all his tyme.

¶ The third rule of chaunges,

for to vse deceit or fraude.

TWo Marchauntes wyll chaunge theyr marchaundise, and the one beguiled the other, the one hath pepper, & the other cloath. He that hath pepper wyll sell for 25 france. the hundreth by chaunge, which is no more worth then 20. fran. in syluer contented. I demaund for how muche ought the other to sell vnto him the elle of his cloath, that is woorth but 15. s. to keepe hym selfe from losse? Aunswer. For the rule of three yee may say thus: if 100 frances of content, gyue me 25 franc. at the chaunge howe much shal gyue me 15 of content? It behoueth you to multiplye the 25 by 15, which beene 373, the which yee shal deuide by 20 and thereof commeth 18. s. 9. d. therefore ye may say that he shal sel the elle of cloathe for 18 shyllynges. 9. d. And thus may ye doo of all other.

Two

The Rules.

Two Marchauntes wyll chaunge their marchaundyse, of whom the one hath 100 pounde of wooll, that is no moze wooꝛth but 15 crownes. And he wyll chaunge with an other in a peece of cloth that is wooꝛth 21 crownes, and he wyll gyue hym the woolle foꝛ 17. crownes. I demaund foꝛ howe muche ought the other to sell the peece of cloth to the ende that he be not betrompedꝰ Answer. By the rule of thꝛee, when 15 are wooꝛth 17, demaund howe muche shall be wooꝛth 21. Deuide by 15, and yee shall finde the same that ye require.

Two Marchauntes wyll chaunge their marchaundyse, and the one defraud the other that hath pepper, and wyll sell it foꝛ 24 franc. the hundꝛeth by chaunge, which is no moze wooꝛth but 20 fr. in money content, & he wyll haue the halfe in mony content. I demaund foꝛ how muche ought the other to sell the elle of his cloth, whych is no moze wooꝛth but 15 s? Answer. Ye must take

aways the money content that the o-ther demaundeth, that is 12 fraunc. for the iust price, & of the which he wyll sell ouer. Therefore take away and with-drawe 12 of 20 franc. which is the iust price, and there rest 8 franc. for 8 and 4 is 12. And ye may say by the rule of three if 8 gyue me 12. what shall gyue me 15. s. which is the iust price of the cloath, mul-tiply 12 by 15 and deuide by 8, and there-of commeth 22. s. 6 d. And therefore the Marchant ought to sell the elle of hys cloath after 22. s. 6. d. els he should haue losse. And thus ye ought to doo of al ma-ner of chaunges and barathes, for if he that hath the pepper, demaunded but the thyrd or the fourth, or 2 or 3, a-bate al onely the same that he shall de-maund, and then by the rule as is sayd And note ye well, that if ye wyll multy-ply shyllinges, ye shall haue shyllinges. And of crownes ye shall haue crownes, and of frances yee shall haue frances, And in lyke maner of all other.

¶ Other rules and questions to haue the more knowledge of the science of Arithmatike, and the first is of collects and talliages.

TEn men owe vnto the king of collect and talliage 244 franc. I demaund how they shall deuide them, to the ende that eche one pay after the valour of his goodes, for it is reason ỹ more be payd by the titch, then by the pooze. For he that is more endowed wyth goodes, is more houden vnto God & to the Prince. Answer. It behoueth to knowe how much eche one is wozth in his goodes and possessions.

The first is woozth 100 frances.
The second woozth 400 france.
The thyzd is woozth 154 franc.
The fourth is woozth 1000 franc.
The fyft is woozth 1150 franc.
The syxt is woozth 40 franc.
The seuenth is woozth 440. franc.
The eight is woozth 80 franc.
The ninth is woozth 600 franc.
The tenth is woozth 300 franc.

Now

Nowe it behoueth you to fynde the multiplicatour and the diuysor. The multiplicatour shalbe eche one by hym selfe, and so for the fyrste it behoueth you to multiplye by 100, for the seconde by 400, for the thyrd by 154, and so yee must do of al the other. And for to fynde the diuisor, yee shall set together all the multiplicatours, as 100. 400. 154 &c. & all that together shall be the deuysor common, which is 4464. Therefore multiplye the collect, that is to wyt 244 for eche one his valour, and deuyde by 4464. or by the halfe, that is 2232. and then yee shall wryte how much eche one ought to paye. ¶ Example.

The fyrste should paye 5 franc. 9 shyllynges 3. d. and halfe, rest 1464.

The seconde should paye 12 franc. 17. shillinges 3. d. resteth 1292.

The thyrd shoulde paye 8 franc. 8. s. 4 pence, resteth: 660.

The fourth should paye 54 frances 15 shillinges 2. d. resteth 1248.

The

The fist shoulb pay 62 frances 17. s. 2 pence, resteth 96.

The syxt should paye 2 frances 3. s. & halfe 2. d. and halfe, resteth 1032.

The seuenth shoulde paye 24 frances 1. s 0 pence, resteth 192.

The eight shoulde paye 4 franc. 7. s. 5 pence, resteth 2064.

The nynth shoulde paye 23 franc. 6. s. 10 pence and halfe, resteth 2088.

The tenth should paye 27 franc. 6. s. 7 pence, resteth 624.

And they haue to deuide 2. pence and halfe of restes.

*Then when ye haue all deuided, & writ the summe and the restes, yee shall set together all the restes, and deuide them by the diuisor common, or by the halfe. And if there be more or lesse, the rule is not well made, for the remaynaut of all ought to be deuided by the diuisor cõmon. And the proofe of this rule is reduction. And marke well this rule for it is ryghte good vnto the

country

countrey where all the goodes be prayſed by al the Townes and Caſtels, as it is in many places of Daulphine, and of Prouence.

The rule of three milles.

One man hath three milles, of whom one grindeth ech day 5 ſeptiers of corne, and the other grindeth 7, and the third 8. There commeth a Marchaunt that will haue grounden one hundreth ſeptiers of corne, I demaunde how ought the Myller to deuide the corne to the mylnes, to the ende that eche one haue aſſoone doon as an other? Anſwer. For to know this queſtion and rule, yee muſt finde the diuiſor and the multiplicator. The multiplicator ſhall be eche one by hym ſelfe, & the deuiſor ſhalbe the three multiplicators ſet together, they be 20 Therefore if yee wyll know how much corne ought to be layde vpon the fyrſte mylle, yee muſt multiplye the 100 ſeptiers of corne by 5, and deuyde by 20. whych ſhall bee 25 ſeptiers, that ſhall be

layde

layde vpon the first mylle. And for the second ye shall multiply 100 by 7, and deuide by 20, and there shall be 15 septiers, the whych yee shall put vpon the second mylle, and for the third yee shall multiplye 100 by 8, and deuyde by 20, and there shalbe 40 septiers, which yee shall put vpon the thyrde mylle. And thus may yee doo of all other semblable. It may be made otherwyse, set together the summes that the three myles grynde, that is 20, and by the rule of three, yee shall say: if 20 giue me an 100, how much shall giue me 5 or 7. or 8? And it is prooued by Addition.

¶ Example. 100.

The fyrst shall haue 25 septiers. The seconde 35 septiers. The thyrd 40 septiers.

7.5.8. 20.

Multiplicatours. Diuisor.

¶ The rule and question of a Sheepheard or Pastour,

Foure

The Rules.

IFoure men haue 300 Sheepe or muttons, of whome the fyrst hath an 100 Sheepe, the seconde 40, the the third 150, & the fourth 10. And they giue vnto a Sheepheard for to keep theire Sheepe 25 franc. for a yeare. I demaunde how ought eche one to paye of the 25. fr after the sheepe that he hath. And how long tyme ought eche one to haue hym at commons or meate? Answer. For to know this rule & all other semblable, it behoueth you to fynde the multiplycator & the deuisor. The multiplycator of the first shall be 100, of the second 40, of the third 150, & of the fourth 10, and than set together all these summes the which be 300 the diuisor common. Or ye maye make it by the rule of three in saying: if 300 giue me 25, how much shall giue me 100 or 40, or 150 or 10, and alwayes deuide by 300. & thus of all other rules.

¶ Example of the first.

100	9	franc.	6 s.	8. d.
40	3	franc.	6 s.	8. d.
				150

150 11 franc. 10 s.
10 0 franc. 19 s. 6. d. 300
Multiplicatours. Diuisor.

Now for to knowe howe longe the one ought to nourisshe hym, yee must make the yeare in monethes, and than multiply by the multiplicatours, as is sayde aboue, and deuide by 300. Or to make it more sure and certaine, yee shal set the yeare in dayes, that is 365, and then multiply eche one by his multiplycator, & deuide by the dyuisor common, that is to witte by 300, & yee shall fynde that the fyrst ought to nourisshe ỹ shrepeheard 121 dayes and a halfe, and a fyrte parte. The second 48 dayes and a halfe and a fyrt parte. The thyrde 182 dayes and an halfe. And the fourth 12 dayes, and the fyrt parte of a daye. And thus may ye doo of all other rules.

¶ The rule and question of a Vessell with three fountaines or holes.

A Vessell

A Vessell holdeth 60 Septyers of wyne, in the whych there be thyree fountaynes or holes, of whom if the least runne it should empty 1 septier in an houre, the next 2 septyers in an houre, the thyrd 5 in an houre. It happeneth that it runneth at all the thyree fountaynes at once. I demaunde in how many houres the vessell shall be voyde, and how much eche one shall voyde by it selfe? Answer. For to know how much eche one shall voide, it behoueth you to fynde the multiplicatours, therefore deuide 30 by 1, and it is 30. which is the multiplicator of the fyrste. For the second deuide by 2, and thereof commeth 15 And for the thyrde deuide by 5, and that is 6. And than sette together all the summes, that is to wyt. 30. 15. and. 6. and they be 51. Therfore multiply eche one by himselfe, & deuide by 51. ¶Example.

30 35 septiers, 1 quart & an halfe
15 17 septiers, 1 quart & an halfe.

rest

rest 4 and halfe.

6 7 septiers 6 quarte, rest 12, 51

Multiplicatours. Diuisor,

And for to knowe in howe manye houres this vessell shall voyde, yee shall set together the three numbers, that is to wyt 1. 25 whych be 8. and that 8 is the diuisor, therfore deuide 60 by 8, and ye shall fynde that in 7 houres and an halfe it shall be empty. And thus maye ye doo of all other semblable.

¶ The rule & question of Zarasins, for to cast them into the sea.

There is a Gally vpon the sea, wherin be thyrtye Marchauntes, that is to wyt, 15 Christian men, and 15 Zarasins ther falleth great tempest, wher vpon it behoueth them to caste all the marchaundise into the sea, and yet for all that they be not in surety from perishing, for the Gallie is feable or weake, so ye by a decree made by the Patrone,

it is necessarye that there be cast into the sea the halfe of the .xxx. Marchants but the Zarazins will not be cast in, nor also the Chzistians. Then by an appoyntment made, they shall sette them downe vpon a row, & then count them vnto 9, and he that should fall vpon the 9 to cast into the sea. howe woulde yee sette them that none of the Chzystyans shoulde be caste into the sea: Answer. Yee shall ozdayne them after these meeters folowing.

Fyrst 4 and then 5, and 2 before one,
Then 3 and then 1 standyng alone.
One and then 2, then 2 and then thzée,
Then 1 and then 2, and 2 with 1 bée.

The Chzistians name fyrst, & zaralins after
In all these numbers, which stand so in ozder.

That is to witte, 4 Chzistians 5 Zaralins 2 Chzistiãs 1 Zaralin, 3 Chzistians 1 Zaralin, 1 Chzistian 2 Zaralins, 2 Chzistians 3 Zaralins, 1 Chzystian 2 Zaralins, 2 Chzistians 1 Zaralyn. Ozfoz to know it moze shoztely ye may

woozke

woorke by this verse folowing, by the number of these vowels.

4 5 2 1 3 1 1 2

Now turn thee man, sit and take rest,
Be it as then be was.

2 3 1 2 2 1

¶ The rule and question of a Testament.

A Man hath made hys testament, the which hath left hys wife great with childe; and hath ordayned in his testament, that if she brought foorth a sonne, he should haue 2 partes of hys goodes, ẏ is to wyt of 1200 crownes & his wife the other part, & if she brought forth a daughter, thē the mother should haue 2 parts, & the daughter the other part. It happeneth whan the man is dead, the wife bringeth foorth a sonne & a daughter. I demaund how shall they deuide the 1200 crownes? Answer: Yee shall set 1 for the daughter, and 2 for the mother, for the mother ought to haue 2 partes against the daughter, and set 4 for the sonne, for he ought to haue two

partes against the Mother. Therefore ye shall multiplye the 200 crownes by 4 for the Sonne, by 2 for the Mother, and by 1 for the Daughter. And for to finde the diuisor, yee shall serre together 1. 2. and 4. which beene 7, therefore deuide by 7

¶ Example.

The Sonne shall haue 685. crownes and an halfe 7 s. 8. d. and halfe, resteth a halfe. d.

The Mother shall haue 342. crownes, & an halfe 12. s. and halfe 4 d. resteth 2 pence.

The Daughter shall haue 171 crownes 11 s. 5. d. resteth 1 d.

421. 7.

Multiplicatours. Diuisor.

They haue to deuide an halfe peny.

¶ The rule and question for to buylde, and fyll for the place.

A Man hath a grounde that is in length 100 yardes, and in bredth 70 yardes, where as he wyll edi-

fye

fye & builde houses, of length 5 yardes and 4 of breadth. I demaunde howe many houses shall he haue vpon that ground? Answer. Yee shall multiplye the length by the breadeth in saying 70 tymes 100, beene 7000, and ethe houle must haue 5 yardes of length, and 4 of breadth, multiply the one by the other. and they make 20, whych 20 shall be the diuisor cõmon, therfore deuide 7000 by 20 and ye shall finde that there shall be 350 houles. Note well thys rule.

A rule and question of the walles.

A Man wyll make a wall 32 foote in length, and 2 of thyckness, and the heyght 25 foote, eche foote shall cost the making 2 s. I demaunde how muche shall cost the makyng of all the wall? Answer. For to knowe thys rule, ye shall multiply the length by the thickness, in saying: 2 tymes 32 beeu 64, and then ye shall multiply it by heyght

in saying: 25 times 64 is 1600, and than multiply by the price, that is to wyt by 2 shyllynges, the whyche be 3200 shyllynges, whereof yee shall make trances, therefore deuide them by 20, and they be 160 trances. And so muche shall coste the makyng of the wall.

¶ The rule and question of the tyling of a house.

If you will haue a house couered with tyles, yee must knowe howe many tyles behoueth you to haue vnto the length of a line, and howe many to the bredth. Example. If the house had neede of 54 for the lengthe, and 34 for the bredthe. I demaunde howe manye shoulde be requysyte vnto all the house? Answer. Multiplye the lengthe by the bredth in saying 34 tymes 54 beene 1836 tyles, and so many must yee haue to couer the house.

¶ The rule and question of a garden.

The Rules.

A Louer dyd enter into a Garden for to geather apples for his lady, and vnto the said garden be three gates, and in eche gate is a porter, and whan he shall issue, after that he hath gathered the apples, he must gyue the halfe of hys apples and one to the fyrste porter, and when he is at the seconde porter, he must gyue vnto him the halfe & one, and to the thyrd porter the halfe and one, and whan he is fourth he hath no more but one apple to gyue vnto his lady paramour. I demaunde howe many apples had he gathered? Answer. He had one apple when he was fourth, set to it one, and than it is 2, then double the 2 and it is 4, therefore he had 4 at the thyrd porter. Then to this 4 set 1. and that is 5, and then double them and it is 10, therefore he had 10 apples at the seconde porter, to this 10 set 1 and it is 11, double them and they be 22 apples. Therefore ye may say that he had gatherd 22 apples.

22
11 — 1
10
5 — 1
4
2 — 1
1

The rule and question of a ladder or stayre.

I haue seene a staire that hath 100 steppes, in the firste steppe was 1 douffe, in the seconde steppe 2, in the thirde 3, in the fourth 4, and so vnto 100. I was demaunded howe manye douffes were in all the stayres. I answered 5050. Probation, I wyll gyue you certaine of all numbers that do proceede naturally, that is to wytte. 1.2.3.4.5.6.7.8.9.10. And infinitelye as ye will, for all number naturall is ended in number euen, or in number not euen, if it be ended in number euen, than by the halfe thereof multiplye the number not euen, that encloseth it. Example. 1.2.3.4. Wil yee know what all amounteth vnto in saying: 2 tymes 5 is 10, for 2 is the halfe of 4, and 5 is the number not euen that encloseth 4. And if the number end in the number not euen, as by example. 1.2.3.4.5. Wyll yee know what all amounteth vnto. Multiplye 5 by his greater halfe, that is 3, saying: 3

tymes

times 5 is 15. And thus shal ye alwaies do in what number soeuer it be euen or not euen.

¶ The rule and question of two men.

IF two men goe by one waye, and that they goe into any farre place, and proceede in suche wyse, that that one proceedeth eche daye certayne number of myles, that is to saye 4 and 6 more or lesse. And that other man goeth encreasing the firste daye one myle, the second day 2, the third day 3, and so encreasing after progression. Be yee all certaine that in some daye the one ouertaketh the other. It is demaunded in what day, and how many myles they shall go? Answer. Double the number of hys myles that goeth eche daye an egal number of myles. And of the number double take awaie one vnite, & the remanant shal shew you what day they shall meete eyther other.

¶ Er.

¶ Example. We shall set it that the one goeth a day 6 myles, double that & it is 12, and fro that 12 wythdrawe one vnite, as it is sayd in the rule, and there remaineth 11, that is the number of the day that they shall meete together. And for to knowe the number of the myles that they haue gone. Multiplye 11 by 6, in saying: 6 tymes 11 is 66 myles that they haue gone. Thus may yee knowe it by the rule of progression continued, 11 is a number not euen, be it therefore multiplied by the greater halfe, that is to wyt by 6, in saying: 11 tymes 6 or 6 tymes 11 is 66. And also one onely number amount by Progression, & by multiplycation, whereby it appeareth that vpon the eleuenth daye they meete eche other, and haue gone 66 myles.

¶ The rule & question of the women that bare Apples to the Market.

Three women bare apples wel and honestly trimmed to the Market, of whom the one bare 50, the other 30, and the thyrde 10, theyr husbandes were brethren and gaue commaundement to them, that they shoulde make as good market one as an other, that they sell all after one pryce, and that the one bryng as muche money home as the other. I demaunde howe that maye be doone? Aunswer. It is possible. For fyrste there commeth a Marchaunt to her, that hath 50 apples, and sayth to her howe many for one peny, and she answered 7, and so she maketh 7. d. of her 50 apples, and hath remaynyng one apple. The other solde after the same pryce. And she that had 30 apples solde hers for 4. d. and shee had remaynyng 3 apples. The other that had 10 apples solde hers for 4. d. and shee had remaynyng 2 apples. And then came ther another Marchaunt that gaue 3. d. for an apple. And so eche one bare home 10. d.

as ye

as ye se in this example. And thus may ye doo of all other semblable.

A rule and question of the bagge.

A Marchaunt hath a bagge that wayeth 19 ounces of three metalles, whereof 7 ounces is of gold, 8 of syluer, and 4 of copper. And he wyll take therout 5 ounces. I demaund how much of gold, how muche of syluer, and how much of copper is in these 5 ounces? Answer. Ye shall multyply the 5 for to know the golde by 7, for the syluer by 8, and for the copper by 4. And for to finde the diuisor, yee shall set all the multiplicators togeather, that is 19 therfore deuide by 19. The aunswer is in this example.

7 Of gold 1 ounce and an halfe 8. d 5 graynes, resteth 1 peny.

Of syluer 2 ounces, 2 d. and halfe, 1 halfe grayne, resteth 2 pence.

4 Of copper 1 ounce, 1 peny 6 grai-

nes,

grayns, reseth 65.

Now set the remnant together and deuide it by the diuisor common, that is 19. And it is 1 halfe graine.

¶ The rule and question of the bell.

IN a church is made a bell, & therein is put 30 pounde of golde. 50. l. of siluer, 100 of tynne, and 102 of copper. Whan the bell is made ther remaineth 40 pounde in one peece, that they will sell, I demaund how much is there of golde, how much of siluer, how much of tynne, & how much of copper? Answer. Ye shall do as is aboue sayde of the bag, for ye shall multiply 40 eche one by hym selfe, and deuide by 282.

¶ Example.

30 Of golde 4 pounde 4 ounces 14. d. grayne, reseth 6.

50. Of siluer 7 pound 1 ounce 11 pence 19 grayns & an halfe, reseth 57

100 Of tynne 14 pounde 2 ounces and halfe

halfe .10. d, and halfe 7. graynes.
resteth 114 pence.
Of copper 14 pound 7 ounces 11 pence and an halfe, 5 graynes & halfe, resteth 105.

Multiplicatours. 282 Diuisor common.

And all deuided they haue of reste 1 one grayne.

This rule is proued by Reduction, set to the same that remaineth, and deuide by the diuisor common, and thereof commeth one grayne.

¶ The rule and question to chaunge gold into siluer.

A Marchaunt hath 100 francke's in gold, and he goeth vnto a Chaunger and saith: I haue 100 franc. in peeces of golde, I would haue the money thereof in small peeces, that is to wyt of 2. d. of 3. d. of 4. d. of 5. pence, of 6. pence, of 8. pence, and of 10. pence, and I would haue as manye peeces of one as of an other. I demaunde how manye

nye peeces of euerye money ought the chaunger to gyue hym? Aunswer. Yee muste set together all these numbers, 2. 3. 4. 5. 6. 8 and 10 that is 32, the dyuysor common, and then ye muste make of the francz pence, that is 24000. d. whych ye shall deuyde by 32, and there be 750 peeces of eche money, and thus ye may doo of all other semblables.

¶ The rule and question of cloath of diuers colours.

I haue a peece of cloath, whereof the thyrde part is white, ye fourth parte blacke, and 8 elles of graye. I demaund how much hath it of length? Aunswer. Set 12. for in 12 yee shall fynde one third and one fourth, the thyrd and the fourth of 12 is 7, and there remayneth 5, therefore forme the rule of three, if 5 be common of 12, of how much shall come 8 multyplye 12 by 8, that is 96, and deuide by 5, and thereof commeth 19 elles and 1 fyfte, therefore ye maye,

answer

answer that the peece of cloath hath of length 19 elles and one fift.

¶ The rule and question of Spiceries.

A Bourgeise sayde vnto his Seruaunt: holde these 13 frankes, and goe and buy me pepper that costeth 15. s. the pound, and sugar that costeth 18. s. the pounde, and of fyne spyces that costeth 9. s. the pounde, & gynger that costeth 12. s. the pound, and cloues that costeth 16. s. the pounde, and bring me as manye pounds of one, as of another. I demaunde how manye pounds ought the Apoticarye to giue him for 13 frankes? Answer. Ye shall set all the prices together. 15. 18. 9. 12. and. 16 whych be in number 65, whych shall be the diuisor, and then yee shall make the frankes in shyllyngs, that 260 shillinges. And then ye shall deuide by 65, and ther of commeth 4 pound, therefore ye may answer that he ought to gyue hym 4

pound

pound, therefore ye maye answer, that he ought to gyue hym 4 pounds of all these spiceries.

✣ The rule and question of the Egges.

A Young mayden beareth egges to the market for to sell, and shee meeteth a young man that would play with her, in so much that he ouerthroweth & breaketh the egges euery one, & will not pay for them. The maid causeth him to be called before the Judge. The Judge condempneth hym to paye for the egges, but the Judge knoweth not how many egges there were. And that he demaundeth of the mayde, she answereth that shee is but young, & can not wel count, but she and her mother had ordained & disposed them by 2 and 2 and there remained 1 egge. Then by 3 and 3 & there remayned 1, then by 4 and 4 and there remayned 1, then by 5 and 5 and there remayned 1, then by 6 and 6 &

there remained 1, and at the last by 7 & 7 & there remained none. I demaunde how many egges there were? Answer. 721. And for to proue it multiplye the numbers one by an other in saying: 2 tymes 3 is 6, 4 tymes 6 is 24. 5 tymes 24 is 120, 6 tymes 120 is 720, and let therto 1 that remained alwayes, & then they be 721, that which ye shall deuyde by 7, and there remayned nothyng, and so she had 721 egges. And after this ensample may the Judge iudge the young man to pay.

¶ The rule and question of money forgotten with a Chaunger.

A Maduocate hath giuen to a Chaunger money, and hath forgotten how much. For to know how much, and for to haue al his money, he findeth subtillty ẏ ensueth, he saieth to one of his sonnes (of whom he hath manye) go vnto such a Chaunger & bryng me a france, and the tenth part of the monney that I delyuered him, and so it was doone.

And

And at another tyme he sayd vnto another sonne, goe vnto the Chaunger, and bring me 2 trances, & the tenth part of the remainant, & so he said vnto all, but vnto the last he sayd: go vnto the Chaunger, and bring me all the remainant of the money, and so was it doone, and as much brought the one as the other: I demaunde howe much money he had, how many sonnes, and how much money eche one of them brought? Answer. For these three questions pose the number, that they all brought, that is, to wit, the tenth be 10, and of 10, take one, and there doo remayne 9, therfore ye may say that he had 9 sonnes, and eche one brought 9 fr. And for to know how muche he had gyuen to the Chaunger, ye must multiply 9 by him selfe, and it is 81. Therefore he had deliuered 81 franc to the Chaunger. For to make the proofe say 81, and take vp for the first sonne 1, & the tenth part of the remaynant, and in lyke maner ye must doo of all other.

The rule and question of tyme. &c.

A Man saith: if I had as muche more of tyme as I haue, & the halfe, the thyrd and the fourth of my tyme that I haue set to, I should haue of yeares 50 I demaūd what age he hath? Answer. Lay 12, for in 12, ye find an halfe, a thyrde & a fourth. And then set thereto once as much, & that is 24, then set thereto one halfe, a third, & a fourth of 12, & they be 37, & then forme thy question. If 37 be cōmen of 12, of how much shall come 50? Multiply 12 by 50, and deuyde by 37, & ye shall finde that he hath 16 yeares 78 dayes and a halfe 10 houres resteth 2.

The rule and question for to deuide distribucions.

If a Churche be 12 Chanons, 6 Prestes, & 6 Clarkes, they haue to deuyde a dystrybucyon of 400 francz, wherof the Chanons haue 3, the Prestes 2, & the Clarkes 1. I demaund how much shal the Chanōs haue, how much

much the Prestes, and how muche the Clarkes? Answer. Multiply one number by an other in saying: 3 times 12 is 36, that is the multiplycator for ỹ Chanons. 2 tymes 6 is 12, the multiplycator for the Prestes, 1 tyme 6 is 6, the multiplicator for the Clarkes. How much the one ought to haue, yee maye see in the example by the diuisor. Set together all the multiplicatours, and they be 54, the deuisor common.

36	240	frances.
12	120	frances.
6	40	frances.

Multiplicator. Diuisor. 60

¶ The rule and question of the Spere.

A Spere is the halfe and the thyrde part within the water, & 9, foote without. I demaund howe muche of length hath the spere? Answere. Set 6, for in 6 is found a halfe and a third, the halfe and the third of 6 is 5, and there remayneth

neth forme the rule of three: If 1 be to men of 6, how many shall come of 9 multiply 6 be 9, and they be 54, deuide them by 1 and they be 34, therefore ye may answer that that speare hath 54 foote of length, the halfe is 27, and the thyrd 18 & there be 45 foote within the water, & 9 without, that is 54. And so maye yee doo of all other semblable, as of a toure.

The rule and question or two men that went the one agaynst the other.

TWo men begyn to go and take theyr iourney the one agaynste the other vpon one daye and in one houre. For that one that goeth fro Paris to Lyons, goeth euery daye 7 myles, that other goeth fro Lyon to Paris, and goeth eche daye 9 myles, and from Lyon vnto Paris bene 80 myles. I demaund how long tyme shall it be or they meete Answer. Set together the myles that they go in one daye, that is to wit 7 & 9

which

which is 16 . Forme now the rule: if 10 come of 1 day, of how much shall come 80 that they haue to goe, multiply 80 by 1, and it is 80, the which ye may deuyde by 16. and thereof commeth 5, therefore in 5 dayes they meete. The proofe is, for he that goeth from Paris to Lyons goeth in 5 days 35 myles, and the other 45, which be in all 80 myles.

The rule and question of a Cat.

There is a Catte at the foote of a tree the length of 300 foote, this Catte goeth vpward ech day 17 foote, and dyscendeth at night 12 foote, I demaunde in how long tyme shall she be at the top? Answer. Take vp and bate the nyght of the day, that is 12 of 17, & ther remaineth 5 therfore the Catte mounteth ech day 5 foote, deuyde now 300 by 5, & ther of commeth 60 dayes, then shee shall be at the toppe. And thus ye maye doo

of all other semblable. For of thys rule, ye maye make 4 questions, as it appeareth in the practise thereof.

¶ The rule and question of twentie Scholers.

If 20 Scholers owe vnto theyr Hoste 5.d. tourneyes, howe ought they to paye so that eche one paye his duty, and gyue the mony of his purs. How much shall eche one paye? Aunswer. Eche one shall paye 1 penye Paris, and the Hoste shall returne vnto him agayne 1 penye tourneys, and so eche one shall paye the 4 part of a tourneys.

¶ The rule and question of Pylgrimes.

Twentye Pilgrimes, that is to wytte men, women, and lyttle chyldren, haue spent in drinke 20 pence, whereof the men paye 3.d. the women 2.d. & the little thildren halfe pence. I demaunde how many men, & how many women, and how many childzen be there for to paye thys 20.d. so that there be 20 persons

sons? Answer. There shall be one man, 5 women, and 14 chyldren.

The rule and question of a Chauntour.

A Chauntour had eche daye of rent fro the Courte of the Kynge 12. s. the whych is payed by knightes, Damosels and Squyres, of whome the knyghtes paye 2. s. the Damosels 6 pence, and the Squires 3. d. I demaunde how manye knightes, howe manye Damosels, and how many Esquires ought there to be to paye this 12. s. so that there be 12 persons? Answer. There must be 5 knyghtes, 1 Damosell, and 6 Esquires.

The rule and question for to deuine.

If yee wyll cause your fellowe to beleeue that ye shall deuyne howe many peeces of syluer he hath in hys ryghte hand, say vnto hym that he put as manye peeces in that one hand as in that other, & then that he take 5 from the left hand to the right hande, and that he put

fourth of the ryght hande into the leaft hand as many peeces as he hath remayning in the leaft hand. And there ſhall remaine 10 in the right hand.

¶ The rule and queſtion of three Sayntes.

A Hermit is entred in a Church wherein there be 3 Saintes, that is to wyt, S. Peter. S. Paule, and ſaynt Fraunces. This Hermit commeth fyrſt to S. Peter & ſayth to him in a manner of hys oraſion: I pray thee that it pleaſe thee to double the ſiluer peeces that I haue in my purs, and I ſhall gyue thee 6, and ſo it was done. Then came he to S. Paule & ſaid to him, if it pleaſe thee to double the peeces that I haue in my purs, and I ſhall gyue thee 6, and ſo was it done. Then came he to Saynt Fraunces and ſayd: if it woulde pleaſe thee to double me the peces that I haue in my purs, I ſhall gyue thee 6, and ſo was it done, & nothyng had he remayning. I demaund how many peeces of

ſyl=

syluer had he in his purs? Answer: He had 5 & 1 fourth, & for to know it double them, & they be 10 and an halfe, and then yee must gyue 6 to S. Peter, and there remayneth 4 and an halfe, double them and they be 9, and then gyueth he 6 to S. Paule, and then there remayneth 3 double them, and they be 6: and that 6 gyueth he to S. Fraunces, & so he hath nothyng remaynyng.

¶ Heere folowyeth diuers other propper rules and questions.

A Lord hired a seruaunt the whych he should gyue euerye yeare 10 nobles and a gowne, & the same seruant dwelleth 7 monethes wyth hym, and then they vary, in so muche that hys Lorde gaue hym licence to go his waye. And sayd: go thy wayes out of my house and take thy gowne wyth thee, and then I am not hyng in thy dette. Nowe I demaund what was the gowne worth. Will ye know ỹ: then marke how many monethes 7 is lesse then a yeare, ỹ is 5

monethes

monethes les: And had the seruaunt tarried so lõg yet by his maister, then shuld he haue had the gowne and 10 nobles. Therfore say thus: 5 monethes giueth 10 nobles, what gyueth 7? make it after ỹ rule of three, & it cõmeth to 14 nobles.

¶ Of three felowes or young men.

Three felowes play together the one to win the others money: For the one had more money then the other. And ỹ first casteth that the one of them 3 leeseth iust so muche money as the other 2 had: Then casteth the second & leeseth also as much as the other 2 had: Then casteth the third and leeseth also iust as much as the other 2 had. And then was the money iust deuided, & had eche lyke much. Now I demaund howe muche had eche or they began to play, & howe much money that eche had whan they plated. Will ye knowe that, then marke how many persons did playe, & adde 1 to them, as heere adde 1 to 3 maketh 4: so many nobles had ỹ fyrst. Nowe dou-

ble

ble 4 cõmeth 8, & subtra 1 from 8 reſt 7. ſo many nobles had the ſeconde. Then double 7 commeth 14, thereof ſubtrat 1 reſt 13, ſo many nobles had the thyrd.

*An other queſtion.

A man byeth 46. li. of ſaffron for 30. pound, what ſhall coſte 63. li. of ſaffron. Will ye know that, then multiply the 30 poundes with the 63. li of ſaffron, commeth to 1890. Nowe deuide them with 46 commeth 41. li. and $\frac{4}{46}$ part of a poũd to pay for the 63. li. of ſaffron. Now will ye know how many ſhyllinges that $\frac{4}{46}$ part of a li. is, than multiplye 4 by 20, for 20 s. maketh a. li. cõmeth 1. s. & $\frac{34}{46}$ part of a. s. Now will ye know how many pence that $\frac{34}{46}$ part of a ſhyllyng is, then multiply 34 wyth 12 pence, maketh a. s. commeth 408, Deuyde them wyth 46 commeth to 8 pence, and $\frac{40}{46}$ part of a peny. Nowe wyll ye knowe how many farthinges that $\frac{40}{46}$ parte of

of a peny is 5 then multiplye 40 with 4, for 4 farthinges make a peny, commeth 160 farthinges. Now deuide them with 49 commeth 3 farthinges and 22/46 part of a farthyng.

This don ye shall finde that 36.li. of saffron cost 41 li. 1. s. 8. farthynges and 22/49 part of a frathing.

Item a 165 pounde of allome coste 2. pounde. 5. shyllynges 6 pence 9 farthynges: what shall cost 22 pounde of allome. If ye wyll soyle thys question, then make of your pounde shyllinges and adde thereto the odde 5 shillynges, cōmeth to 45. s. Then make of the 45. s. pence, and ad 6 pence, commeth to 546 d. then make of your pence farthynges and adde thereto the 9 odde farthyngs, commeth to 2193 farthing. Now multiply the farthynges with 22, commeth to 48246 farthinges. Nowe deuyde them w̄ 165. commeth to 592 & 66/165 parte of a farthyng, for so manye farthynges

shal

ſhall coſt 22. li. of alome. Nowe will ye knowe howe manye pence that the foꝛe-wꝛitten farthinges make, then deuyde them with 4, foꝛ 4 farthinges make a peny. Then will ye knowe howe many ſhyllinges that they make, then deuide the pence wyth 12, foꝛ 12 pence maketh a ſhyllyng. Thus done ye ſhall find that 22. li. of alome coſt 6. s. 3. d. 1. farthing. and it is doone.

¶ Another queſtion.

A Marchaunt hath bought a bag of pepper, I ſay not howe heauy, but when he gyueth foꝛ a pounde of pepper 12. d. then remaineth him yet 37 pence. And when that he giueth foꝛ a pound of pepper. 15. d. then he lacketh 44. d. to paye foꝛ the pepper. Now I demaund howe heauy the bag of pepper was, and howe much money ẏ the Marchaunt had. Foꝛ to knowe this & ſuche other lyke queſtyons, ye ſhall take and ſubtrah 12 from 15 & there reſteth 3, wheych 3 ſhall be your deuiſoꝛ. Then ſhall ye adde 44 and 37

toge-

together, & that maketh 81. Then muste ye deuide 81 with 2, & thereof cõmeth 27 so many pound waight the bag of pepper. Now wil ye know how much money the Marchaunt had, then must yee multiply 12 w̃ 27, & adde 37 thereto, or multiplye 15 w̃ 27, & subtract 44 cõmeth 361, so many pence had the Marchant.

* Another question.

A dronkard drinketh a barel of beere in the space of 14 dayes, and when hys wife drinketh with him, then they drink it out wythin 10 dayes. Nowe I demaunde in what space that hys wyfe should drinke that barell of beere alone. For to soyle this question & suche other lyke, ye shall first subtract the least drinker from the more, that is 10 from 14, and there remaineth 4, and that is your diuisor. Now saye: 4 geueth 10, what giueth 14. make it after the golden rule, and ye shall finde that she shoulde drinke it in 35 dayes.

¶ Heere endeth the Introduction of Algorisme for the pen.

Here beginneth the Introduction for to learne to reckon with the Counters, with diuers rules belonging, to the same.

C. thousand.

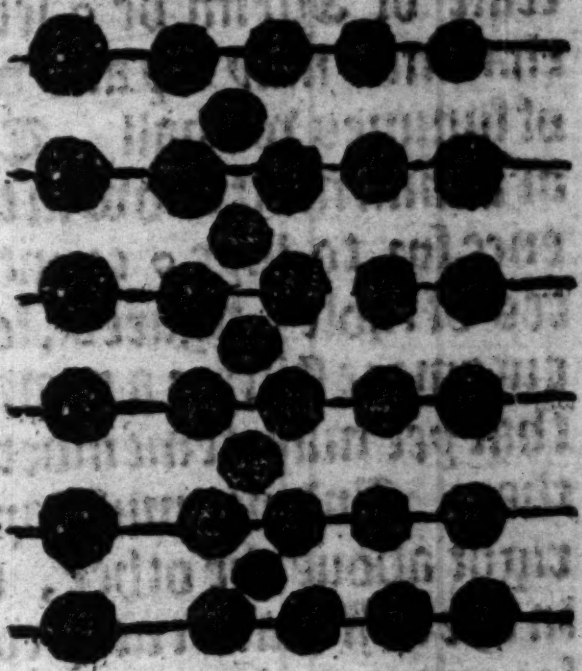
X. thousand.

Thousand.

Hundreth.

Ten.

One.



FOr as much as there be many persons that be vnlearned, and can not write, yet neuertheles the craft or science of Algrim and reckoning is needefull

full for them to know, wherefore I shal hereafter declare & write of this science in the best & shortest wise that may be possible, howe that yee shall order your selfe in reckoning & to cast counters.

First ye shall vnderstand that in the craft of Agrim be 9 letters or figures that men may lay and write al manner of summes withall. Therefore first of al a man must know in this craft or science for to laye 9 counters in the places of those 9 figures, for they must lye euermore still for a remembraunce, so that yee may remember your place by them. And yee must laye them the one right aboue the other, that is to saye, in the first place euery counter standeth for one, and the neathermost counter is the fyrst place. In the second place euery counter standeth for 10. In the thyrde place for a 100. In the fourth place for a thousande. In the fyfte place for 10 thousande. In the syxt place for a 100 thousande. In the seuenth place for a

myllion. In the eyght place for 10 myllions. In the ninth place for a hundreth myllions. In the tenth place for a thousand myllions, and so foorth infinitely. And note well that euery counter that is layd betwene the lynes, betokeneth euermore 5 tymes more then the counter that lyeth in the place nexte vnder him, that is to saye, the firste counter lying alone aboue the fyrst place betokeneth 5, the counter lying alone betwene the seconde & the third lyer and place, standeth for 50, aboue the thirde place 5 hundreth, aboue the fourth 5 thousand, aboue the fift place 50 thousand, aboue the sixt place 500 thousande, aboue the seuenth 5 myllions, aboue the eyght 50 myllions, aboue the 9 place 500 myllyons, aboue the tenth place 5000 myllyons. But if ye will the more surely knowe your places, it is necessarye for you to marke euery place with a marke, as to lay a coũter or some other thing which shall lye styll, & in no wyse be remoued,

but ye must take heede if ye lack counters for the marke of your places, that ye lay them not nie the counter that ye must worke with all, least that yee take the one for the other, but laye them as ye see them marked in the examples following. And whan ye haue layd markes, & knowe the order of your places, ye may adde & subtra, multiply and deuide what numbers yee lyst, that is to say, to cast & to abate at your pleasure.

Item whan there lye 2 counters betwene two liers, take them vp and lay 1 besyde the next lier aboue them. And when there lye 5 counters besyde anye lyer, take them vp and lay 1 in the next space aboue them.

Of addition.

Addytyon is none other thing but to set tte togeather 2 or 3 numbers & to make of them a totall summe, as in the example folowing.

There is a man which oweth 20. li.

18 pound. 100. pounde, 50 pounde, and 69 pounde. Nowe if ye wyll knowe howe much that all thele ſummes maketh to gether. Then for the firſt ſum yee muſt lay 2 counters beſyde the ſeconde lyer, for they ſtande for 20, that is for the fyrſt ſumme. Nowe for the ſecond ſum lay 1 counter beſyde the ſeconde lyer, for that is 10, and laye 1 counter betwyxte the neathermoſt and the ſecond lyer, for that 1 ſtandeth for 5, and then laye three counters beſyde the neathermoſt lyer, and they altogether maketh 18. Nowe for the thyrd ſum ye ſhall lay 1 counter beſide the thirde lyer, for that is an 100. For the fourth ſumme lay 1 counter beſede the thyrd and the ſecond lyer, that is 50. Now for the fyrſt ſummes laye one counter betwixt the thirde and the ſecond, and 1 beſyde the ſecond lyer, and 1 betwene the ſecond and the neathermoſt, and 4 beſyde the neathermoſt lyer and that maketh together 69, and in ſo dooing yee ſhall fynde that all the

fore wrytten summes make togeather 257, as ye shall see in the figure folowing. And euermore for a generall rule remember your places, for euery counter that lyeth belyde the first lyer, standeth but for 1, in the seconde place euerye counter standeth for 10, in the third place for 100, as is before rehearsed.

Wyll ye proue whether ye haue added well or not than subtract all your summes one after an other. And in lykewise as ye doo with this example, so ye shall doo with all other of addition.

Of Subtraction.

Subtraction is if yee will withdraw any summe from an other sum, yee must know 2 numbers that is to wyt, the number that ye wyll withdraw, and the number wherefore ye will withdraw. An example. There is a mã that oweth you 9756 pounds,

and

and thereof he hath payed you 5989 poundes. Now if ye wyll know what ther resteth, then set downe your sum that he ought you, & thereof withdraw ỹ sum that he hath payed you, & that ỹ remayneth is the summe that hee doth yet owe you, as yee more plainely maye see in the exampple hereafter folowing.

And when yee haue set your debt, that is to say 9756 poundes vnder this maner, as before is shewed. Thē if ye will know the rest, then take therof that yee haue payed as 5989 poundes. Now for to do this, ye shall first take vp ỹ counter that lyeth between the fourth & fifte lyer, for that is 5000. Then take vp one of the counters whyche lyeth beside the fourth lyer, & that is 1000, and ye should take away but 900 therfore ye must lay

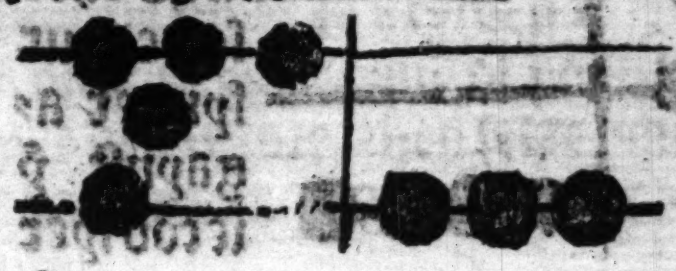
down 1 counter againe beside the third lyer, that is 100 l. Then take vp one of the counters that lieth beside the third lier, which is 100, from which ye should take but 80, therefore yee must lay two counters beside the second lier, that is 20, and 80 that yee haue taken vp maketh 100, then take vp one of the counters that lyeth beside the seconde lyer, that is 10, and yet should haue taken away but 9: therefore yee must laye one counter beside the neather most lyer, that is 1, and the 9, that ye haue subtracted or taken vp, maketh 10, and there remayneth 3767 pound debt, and they stand thus.

Wyll you proue whether yee haue subtracted well or not, then adde thereto that yee haue payed, and if the summe come thē so great as it was afore, then is your subtraction true, els not.

¶ Of

¶ Of Multiplication.

Multiplication is nothing elſe but to multiplye one number by an other, as thus, to knowe what is 6 tymes 9 or 6 tymes 12, and luche lyke. And in multiplication yee muſte conſider two numbers, that is to wirte the number that yee wyll multiply, and the number wherby ye wyll multiply, and ye muſt wooꝛke in multyplycation after this manner. Fyꝛſte yee ſhall laye downe the leſſer number, whych is 6, and this 6 is the number that ſhall be multiplied, & the 9 is the number that ye ſhall multiplye with all. And ye ſhall lay the number that ſhall be multiplied at the right ſyde of your lyers, & when ye wooꝛke your multiplication, ye ſhall laye them at the leaſt ſyde, as in thys example hereafter folowing ſhall moꝛe playnely appeare.

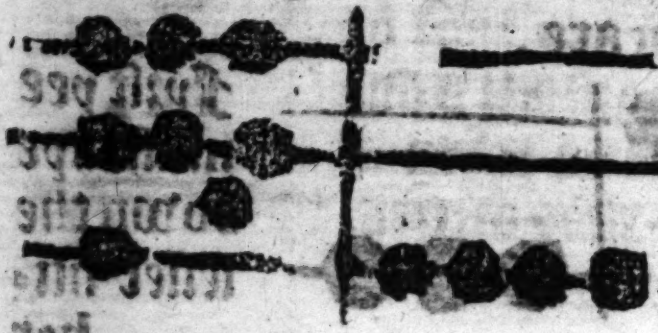


Fyꝛſt yee muſt laye downe the leſſer num-

ber

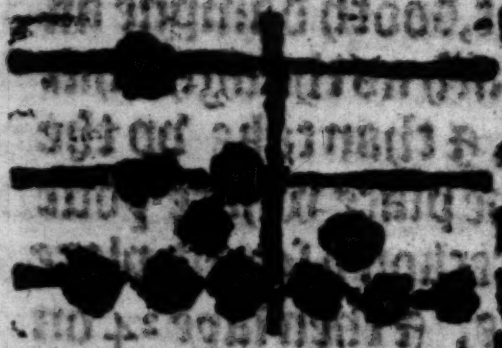
ber, whych is 4, as in this example yee
see them layde here on the ryght hande
of the lyers. And when that yee haue
thus done, yee muſt take vp one coun-
ter and laye 9 for it on the other ſyde of
the markes, that is to wyt, at the leafte
ſyde. And after that take vp an other
counter, and laye alſo 9 for it, and ſo
forth for euery counter that yee take vp
ye muſt laye 9 for it at the other ſyde.
And when that yee haue ſo wrought
your worke, it wyll come luſt to 36, as
ye ſee the counters before layde on the
leaft hand of the lynes.

And if yee wyll multiplye by greater
numbers, as thus, to knowe what is
24 times 14. Firſt laye 14 on the ryght
hand of your lyers, or markes, as this
example folowyng ſheweth.



And ther
ſet your
fynger a-
gaynſt ỹ
ſecõd lyer
and

and that finger so set, dooth dampne all the places vnderneath as though they were the first place, & than take vp the counter ỹ lyeth in the place where your finger is, and now reckon ỹ second place to be your first place, & then laye 24 on the leaft hand of your marke, as the ex-ample sheweth. After that don take a-way your finger, & then take vp 1 of the 4 counters, & for him lay 24 on the leaft syde, as ye did before, & so for euery coun-ter that ye so take vp lay 24, and it shall come to 336 as the exãple before shew-eth, and then yee haue the effect of your question, that in 24 tymes 14 make iust 336. Furthermore if there happen anye counter lye betweene the places, as 5, or 50, or 500, or such other, then yee must take heede howe yee reckon in the multiplyinge, as thus: if yee woulde knowe what is 8 tymes 16, firste laye 8 on the ryght hand of your lyers, As yee dyd before, then sette your finger at the counter that lyeth alone aboue the

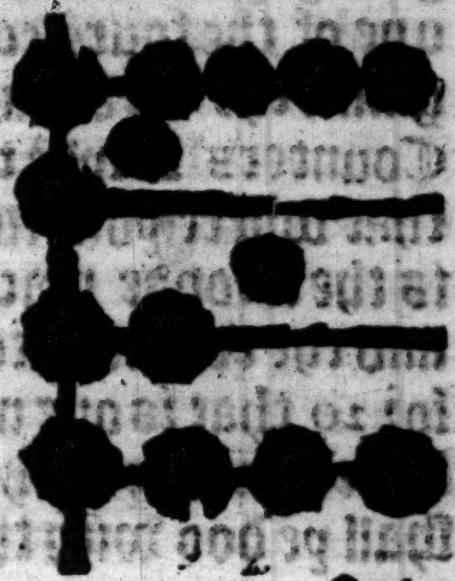


fyrste place whych was layd for 5, and then reckon that place to be the first place, and then reckon the space that is betweene the seconde place, and the third place, to be your second place, so that yee muste reckon hym 10 from the place where your finger is, but this ye muste especially take heed of, that ye reckon the place next aboue your finger to double the place where your finger is. For if ye take heede yee shall euidently see it by reason, for 2 tymes 5 maketh 10, & 10 tymes 5 maketh 50. Then to proceede in your question, ye muste worke it after this maner: take vp your counter at your fynger, and lay for it on the right side of your marke 16, after that manner laye a counter in the space nexte aboue your finger, and reckon hym for 10, and then lay 3 counters in the place next aboue your finger, & reckon euery

chone of them for 2, which maketh iuste 6, then 10 and 6 maketh iuste 16, as the figure before shewed. When yꝛ haue so doone, then take awaye your synger, and for euerye one of the 3 counters that lieth in the fyrste place on the right syde, laye 16 on the leaft syde, and then take them of the ryght syde away. & yee shal see that the number shall come iust to 128, as the example before shewed. And this wise ye must recken all counters that lyeth in the spaces, if the multiplication shall be truly made.

Another example.

For to knowe howe many grotes be in 4563 nobles.



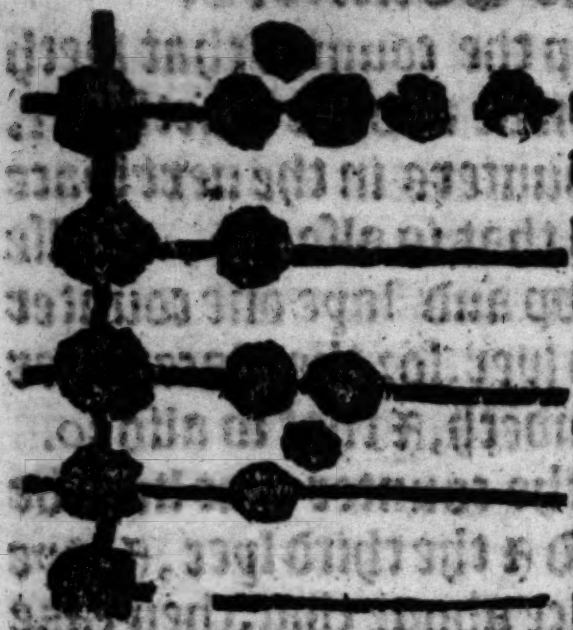
Fyrste ye shall set downe the lesse nũber that is the nũber that yee shall multiply, as thys fygure folowinge plainly heer sheweth.

Nowe for to make of these nobles grotes, ye must multiply them with 20 for 20 grotes make a noble. Nowe for to multiply this number euermore, yee must lay down the number that ye will multiply at ỳ right side of your marks, and set your fynger agaynst the marke that ye begyn at, for your finger shalbe a remembraunce to you, for that place where your fynger standeth, is the fyrst place, & damneth all the places vnderneath hym.

Nowe for to make groates of these 4563 nobles. First yee shall set your fynger agaynst the fourth lyer, and take vp one of the foure counters that lyeth against the layd fourth lier, and lay two Counters beyde the nexte lyer aboue that where your finger stãdeth, for that is the seconde place from your fynger, and the two counters so layd, standeth for 20 that is one noble, and like as yee have done wyth thys one counter, so shall ye doo with the other 5 folowing.

Then

Then take vp the counter that lyeth betwene the thirde and the fourth lyer, and lay two counters in the next space aboue that, and that is also 20 . or else ye may take it vp and laye one counter beside the secõd lyer, for the place wher your finger standeth, & that is also 20. Then take vp the counter that lieth betwixt the second & the third lyer, & laye 2 in the next space aboue that, then take vp the counter that lyeth beside the second lyer; & laye 2 counters beside the next lyer aboue that same. Then sette your finger against the first lyer, & take vp one of the 3 counters, and lay 2 counters for it beside the next lyer, aboue that, and as yee haue don with that, so must ye do with the 2, and then ye shall fynde that 4563 nobles maketh 91260 grotes, and standeth thus, as the example hereafter sheweth. And as ye haue done with these forewritten exãples of multiplication, so shall yee doo with all other of multiplication.



Wyl ye knowe or proue whether you haue multiplied well or not, then deuide ỹ groates, that is 9126. by 20, and if the summe come to stand as it was before, then haue yee multyplyed well. And thus alwaye yee maye make your proofe vpon all manner of multyplycatours.

¶ Of Diuision.

Diuylyon is to deuyde a summe thorowe an other summe, and in this diuylyon must be knowen two numbers, that is the number that yee wyll deuyde, and the number wherebye ye wyll deuide it, as to knowe how many tymes ye may haue a small number out of a groat, as by example.

If ye will deuyde 336, by 14 as in thys ensample hereafter, ye shall laye 336 on the ryght hand of your lyers, and then set your fynger at the hyest place where any counter lyeth, for as I shewed you before that banneth all the other places beneath, so that then there as your fynger is, is the fyrst place. And then looke if ye may take 14 from that place, whych ye can not doo, for euery counter standeth but for one because your fynger is there, therefore ye must remoone your fynger to the nexte place beneath where the other 3 counters lye, and then looke if yee may take 14 from that place which ye may doo ryght well, for these 3 counters at your fynger standeth but for 3, and the other 3 counters aboue standeth for 10, and then see howe many tymes 14 yee may haue out of 33 and so many counters yee must laye on the other syde iust agaynste your fynger, that is to saye, yee maye haue 28 out of 33. that is twoo times 14 out of 33, & there-

foze ye must take vp 28, and laye 4 counters on the other syde against your finger, and then yee can haue 14 no moze, then ye must remoove your fynger to the next place beneath, and then reken that place at your finger to be the fyrst place, as ye did before, & then looke how many times ye maye haue 14 from that place, whyche yee cannot, for that counter at your fynger standeth but for 1, and the other in the space aboue standeth but for 10, whyche is in all but 11, therefore ye must remoove your fynger to the next place beneath, and then yee shall see that that number is 56, out of ꝑ which yee may well take out 4 tymes 14, which maketh iust 56, therefore yee must take vp 56 and laye 4 counters on the other side against your fynger, and then take away your fynger, & yee shall

see that that number that ye haue layde on ye left side of your markes commeth iust to 24, as the example before shewed, and then yee haue your question soyled. For if ye deuide 336 by 14, it commeth iust to 24, for 24 tymes 14, maketh iust 336, as I haue shewed you before in the rule of multiplication. And likewise as ye haue deuided thys number ye may do with all other numbers. And if ye wyll proue whether yee haue well deuided or not, take the number that commeth of your diuision, & multyply it with the small number, ye is your diuisor, & adde that remayneth thereto if there be any, & then it will come iuste to the great number that was the number to be deuided. And lykewyse if yee wyll proue whether ye haue truly multiplied or no, take the great nūber that commeth of your multiplycation, and deuide him by the number that is to be multiplyed, and it will come iuste to the third number that was your multiplier

If you desire to knowe howe many grotes be in 7992 pence. First yee shall set downe your pence as yee see in this figure here, & yee shall deuyde them wyth 4, for 4. d. maketh a grote. Now to the operation thereof, when that yee haue set downe your pence, as the figure aboue sheweth, then set your finger at the hyest counter, & see if yee maye haue 4 from that place, whych yee cannot for there lyeth but one, and it standeth but for one; because your fynger standeth there, therefore yee shall remoue your finger, and set it agaynst the fyft lyer, & see if yee may take away 4, the whych ye may doo, for ther lyeth 7. Now your fynger standeth agaynste the fyft lyer, therefore yee shall take vp the counter that lyeth in the nexte space aboue your

fynger, for that counter is 5. & ye should take vp but 4. therefore yee shall take it vp and laye it beside the fyft lyer of the right side, and laye one on the leaft side also beside the fyft lyer, then see if you can haue 4 any more from that place, the which ye cannot, therefore remoue your fynger, & set it against the fourth lyer, and then see how many tymes 4 yee may haue out of 36, yee may haue 9 tymes 4, and for this 9 tymes 4 ye shall laye one counter in the space betweene the fourth and fyft lyers, and 4 beside the fourthe lyer, and that maketh 6. And as you haue doone with these, so shal ye doo with all other folowyng. & when ye haue fynished your worke, you shall fynde the 79992 pence make 19998 grotes, as ye may se plainly here in this figure.

¶ The proofe.

If ye will proue whether ye haue deuided well or not, then multyplye the grotes with 4. for 4. d. maketh a grote, and if the sum come to stand as it did before, then ye haue deuided wel.

Item when ye haue any summe wyth pence, if there remaineth any thing, it is pence. And if ye deuide by shyllynges, if there remayneth any thing it is shyllinges. And as ye haue doon with these fore wrytten examples, so maye yee doo with all other,

¶ The golden rule.

REgula aurea is called the Golden rule, for lyke as golde passeth all other mettall, so thys rule passeth all other rules in Agrym. And to the operacion of thys rule must alwaies be noted three thinges or three numbers, of the which two of them must be lyke of names and of kind, that is to witte, the fyrst and the third number, & alwayes

ye shall multyplye the seconde number with the thirde, & that that commeth of the multiplicatiõ is the number to be deuided by the fyrste number that is generall deuysor, and the quocient of the deuysor sheweth a number of solucyon of name and kynde of the middle numbers, as in these exãples folowynge shall appeare.

If a man byeth 40 egges for 20 pence, how many for 12 pence? If ye will soyle this question, yee must multiplye the second and the thyrde number together, and the product or the summe that commeth of that multyplycatyon, yee shall deuyde by the fyrste number, lyke as here is shewed in thys example. When ye buie 40 egges for 20 pẽce, what shall one pay for 12 egges? Ye shall multiplye 20 wyth 12, commeth to 240, the which ye shall deuyde wyth 40, commeth to 6 pence, and so much shall yee paie for the 12 egges. And thus ye may doo with all other such questions.

¶ Another question

Item a 100 apples cost 12 pence, what shall one pay for 87? Yee shall multiply 12 wyth 87, commeth 1044, the wheych ye shall deuide with a 100, commeth 10 pence 44 part of a. d. for the 87 apples.
100

Will ye know how many farthynges that the 44 hundreth part of a penye is worth, then multiply 44 with as many farthinges as a peny is wooorth, that is 4 cõmeth 176, the which ye shall deuide with a 100 commeth 1 farthyng, and 67
part of a farthyng.

Item 165 pound of waxe cost 21. li. 5 s. 6. d. 9. mites, what shall cost 22. li. For to soyle this question and suche other lyke. First ye must make of pounds, shyllynges, and adde thereto the odde 5 s. the which standeth in this question, and they come together to 45 s. then make of the shylling pence, and adde thereto the odde 6 pence that standeth in the question, cõmeth to 546. Dp then make

of the pence mytes, and 24 mytes is a peny, & thereto adde the odde 9 mites that standeth in the question, commeth together to 13113 mytes, and that is the total summe of all the poundes, shyllinges, pence, & mites togeather. Nowe make it after the rule & say: 165 pounde of ware cost 13113 mites, what shall coste 22 pound? Fyrst multiplye the myddlemost and the last togeather, that is: yee shall multiply the mytes wyth the laste, ẏ is with 22, & it shall come to 288486 deuide them with 165, and it shall come to 1748 mytes, and $\frac{66}{165}$ parte of a myte, so manye mytes shall the 22 pounde of ware cost. Now wil ye know how manye pence that the forewrytten mytes make, then deuide them wyth 24, for 24 mytes maketh 1 peny. Then will yee know how manye shyllynges that the pence make, then deuyde them wyth 12 for 12. d. maketh a. s. And thus dooyng yee shall fynde that the 22. li. of ware

shall

shall cost 6 shyllynges, 20 mytes and $\frac{66}{165}$ part of 1 myte, and it is done.

Item when ther stādeth 1 in the first place. As 1 goose cost 3.d. what shall cost 28? Yee shall multiply the middlemost wt the last, in saying 3 tymes 28 is 84, so many pence cost 28 geese, & it is finishe.

Item in the contrary, as when that cōmeth in ẏ latter ende, as he ere in this example 20 capons cost 23 pence, what shall cost 1 capon. For to soyle this question yee shall deuide the middlemost wt the fyrste, ẏ is 23 with 20 cōmeth 1.d. & $\frac{3}{10}$ part of a peny, that is 10 mytes & $\frac{4}{5}$ part of 1 mite for 1 capon.

Item 17 elles & $\frac{1}{3}$ cost 14 nobles & $\frac{1}{3}$ part of a noble, $\frac{2}{4}$ what shall coste 32 els & $\frac{2}{4}$ part. For to soyle thys question and suche lyke, fyrst yee must breake the fyrste & laste broken together crossewise in saying 1 tymes 4 is 4, sette the 4 by 17 elles. Then say 3 tymes 2 is 6, set the 6 by the 32 elles. Then multiplye both the numbers of your fractions together

gether, in saying 4 tymes 2 is 8, the whych ye shall set vnder 4 and 6 then it standeth thus, as in the rule of three, if 17 els & |4/8| parte of an elle coste 14 nobles, |1/8| and |1/5| parte of a noble, what shal cost 32 |5| elles & |6/8| parte of an elle. Fyrst multyply the first hole number wyth the neathermost of hys broken, that is 17 with 8 cōmeth 136, & thereto ye shall adde the 4 that standeth aboue 8 cōmeth 140, the which yee shall multiplye with the 3 that standeth vnder the second broken, cōmeth 420, that is your deuisor, then multiply 14 wyth the 3 that standeth vnder 1, & adde that 1 thereto cōmeth 43, that is your multyplicatour, then multiplye 32 wyth the neathermost figure of his broken, that is with 8, and adde thereto the same 6 that stādeth aboue the same 8 commeth 262, Now set it in ẏ rule of three in saying 420 elles cost 43 nobles, what shall cost 292. multiply ẏ second wͭ the thyrd and then deuide that ẏ commeth of that

multi-

multiplication wyth the fyrste, and yee shall fynde that the 32 elles of cloath cost 29 nobles 19.d. 34 mytes, and 130 part of a myte.

Item when that there standeth at the beginning a whole number wyth a broken, and in the second & thirde place no broken, as here: 36 elles, and 1 coste 8.li. what shall cost 16 elles.

For to soyle this question, ye muste multiply the fyrste whole number wyth the vndermost fygure of his broken, that is 36 with 2, and adde the 1 thereto that standeth aboue 2 comming 73, and that is your deuisor, then multiplye 8.li. also wyth the vndermost fygure of the broken that is to wit with 2, & it commeth to 16, then multiply 16 with 16, commeth 259, the which ye shall deuide with 37, & it will shewe you that there shalbe to pay for the forsayde cloath 3 pound, 10 shyllinges, one peny, 17 mytes, and 33 parte of a mite.

Item when there standeth in the fyrst

or in the second no broken number, but in the latter end a whole nũber with a broken, as here 14 ounces of graine cost 14.s. what for 9 ounces of graine, and one thyrde. For to knowe thys yee shall multiplye the fyrste 14 with 3 that standeth vnder the broken, commeth to 42 that is your deuysor, then multyplye 9 wyth 3, and adde that 1 thereto that standeth aboue 3, commeth to 28, then set it thus 42 gyueth 14, what gyueth 28. Make it forth after the rule, and yee shall fynde that there is to paye 9 shyllynges 4 pence for the 8 ounces of graine and one thyrd part,

Item when that ye fynde neythet at the begynning nor at the latter end no broken number, but in the myddest a whole with a broken as heere. A man bought 48 sheepe for 64 crownes and what shall one paye for 18 sheepe.

For to loyle this question yee must multiply 48 with 4, whych commeth to 192 that is your deuysor, then multiplye 64

wyth 4, and adde thereto the 2 that standeth aboue 4, commeth to 258, the which ye shal multiply with 18 commeth to 4644, the which ye shall deuide with 102. And thus yee shall fynde that yee must pay for the 18 sheepe 24 crownes, 4 styuers and 36 mites Brabans.

Item when ye finde no broken at the begynning, but in the second and thyrde one whole with a broken. As 7 elles for 6 pound $\frac{1}{4}$ what shal cost 16 elles and $\frac{1}{8}$.

For to soyle this question ye must multiplye the two vndermost broken numbers together, in saying: 3 tymes 4 is 12, the which ye shall multiply wyth 7, commeth to 84 ye is the deuisor. Then multiply eche with this broken cōmeth 25 & 49 the whych ye shall multiply one with the other cōmeth 1225, the whych ye shal deuide with 84, and the solucion shalbe to pay 14. li. 12. s. 18. d.

When that ye finde at the begynning & the myddest a hole with a broken, and

at

at the latter end standyng a hole wyth-
out a broken, and 9 elles and $\frac{5}{4}$ for 5 li.
$\frac{5}{8}$ what shall cost 15 elles, multyplye 9
wyth 4, & adde thereto 3 cōmeth 59, the
which ye shal multiply with 8 commeth
312, that is your dyuysor, then multiplye
5 with 8, & adde therto the 15 that stan-
deth aboue 8, commeth 45, the which ye
shall multiply with 4 that standeth vn-
der the first broken, commeth 180. Now
sette it in the rule of three in saying: 312
gyueth 180, what gyueth 15, make it af-
ter the rule, and it commeth to 8. li. 13. s.
22 mytes, and $\frac{19}{57}$ of a myte.

The rule of company.

There be 3 marchauntes or compa-
nions, the whych lay together their mo-
ney in marchaundise, & ech to win after
his inlaying. The first laid in 170 crow-
nes, the second 60 crownes, ẏ thyrde 40
crownes, & with it they haue won 50
crownes & all costes, I aske how much

that

that ethe shall haue after hys laying. Nowe for to loyle this question and all such other rules of companye, yee must make of theyr money that they haue layd in a totall summe, commeth to 250 nowe say 250 gyueth 50, what gyueth 150, make it after the rule of three, and it commeth to the fyrst man 30 crownes wynnyng. Nowe for to knowe what the second hath wonne yee shall say: 250 gyueth 50, what gyueth 60, make it after the rule and yee shall fynde that the second hath wonne 12 crownes. Wyll yee knowe what the third hath, then say 250 gyueth 50, what gyueth 40, make it after the rule, and yee shall fynde that the third hath won 8 crownes. And thus shall yee do all other rules of company

¶ The rule of company with tyme.

Three fellowes put marchaundyle together, whereof the fyrste layeth in 50 crownes for 4 monethes. The second

seco̅d 80 crownes for 2 monethes. The third 100 crownes for 5 monethes, and withal this money they haue wonne 6 crownes beside their costs paid. Now I demaunde what eche hath wonne with his money. For to knowe this, ye must multiply eche mans money wyth his time, that is for the fyrst 50 wyth 4 cōmeth 200 set that as though he hath layde in so muche, for the seconde multyplye 80 wyth 2 commeth 160 set that also as though he had layd in so much. Now adde the 3 numbers together, & then make it after the rule of company and then shall yee finde what eche hath wonne with his company.

¶ The rule of barteringe.

Two marchaunt men wyll chaunge their wares together, and the one hath a fine black cloath the which is 43 elles long, and he wyll gyue the elle no lesse then 18 pence. The other Marchaunt hath pepper, and he will sell the pounde no lesse then 13. d. Nowe I demaunde

howe many pounde of pepper the fyrſte marchaunt ſhall haue for his 43 elles of cloth. For to ſoyle this queſtion ye ſhall ſay 13 gyueth 43, what gyueth 18, make it after the rule of 3 & ye ſhall finde, that the firſt ſhall haue for his cloth 59 poũd of pepper, 8 ounces, 12 engliſhe and 4/13 part of an englyſh.

¶ Of a VVatte.

A Watte runneth in the fielde & ouerrunneth in one minute (there be 60 in an houre) 12 roddes of grounde. And a Grayhoũd being her enemy, foloweth her and ouer runneth in one mynute 15 roddes of grounde. But or the Grayhounde began to runne, the Hare had run 200 roddes of land. Nowe is to be demaunded in howe manye minutes & howe manye roddes of lande was the Haue taken. For to ſoyle this queſtion and ſuch like, ye ſhall ſubtract the leſſe running out of the more, that is 12 out of 15, and there remayneth 3, and therewith ye ſhall deuide the ſpace that the

Hare

Certaine rules.

Hare hath run before the Grayhounde began to runne, that is 20 roddes: And in so dooing ye shal finde that the Grayhound ouertoke the Hare in the 66 minutes, and $\frac{2}{3}$ partes of a minute, that is one houre and 6 minutes, and $\frac{2}{3}$ of a minute. Wyll yee knowe how manye roddes that the Grayhounde did run, or that he tooke the Hare, then multyply 66 and $\frac{2}{3}$ wyth 15, commeth to $\frac{3000}{3}$ the which ye shal deuide with 3 cõmeth 1000 whole, so manye roddes dyd the hound run or that he tooke the Hare.

The rule of 2 felowes.

TWo fellowes went togeather out of a towne, and the one goeth euery day 12 myles, & the other goeth the first day but one myle, & the second daye 2 myles, the thirde daye 3 myles, and so forth euery day one myle more. Now I demaunde in howe manye dayes, & how many myles went he or that he

ouertooke his felow. For to soyle this question, ye shall double the myles of him that went euery daye lyke muche, that is 12, and 2 tymes 12 is 24, thereof yee shall subtract the one myle that ỹ other goeth the fyrst daye, and there resteth 23, vpon the same daye was the first man ouertaken of hys companion. Will ye know in how many myle, then multiply 23 with 12 commeth 276, for so many miles wēt he or he ouertook him

Item there is a fellowe gone out of London towarde Salysburye, and he goeth euery day 8 myles, and an other felow commeth from Salysburye, toward London, and goeth euerye daye but 6 myle. Now I demaunde in howe many dayes shall they two mete. Now for to soyle this question and suche other lyke: First ye must adde togeather the number of the myles that they goe both in one day, that is 8 and 6 maketh 14, therewith deuide the lengthe from the one towne to the other, that is 60

myles,

myles, and in this doing ye shall fynde that they goe 4 dayes and $\frac{4}{4}$ parte of a day or they meete.

A Lord had hyred a workeman, the which he gaue euery day whan that he wrought 5 grotes, and when that he playeth he spendeth euery day 4 grotes and when that it came to the ende of a 100 dayes, the Lorde, and the woorkeman reckned together, for the woorkeman had yet receyued no money of the Lorde, and when they had reckoned, they came iust out, for the woorkeman had spent as muche as he had wonne: Now I demaund howe manye dayes went he playing, and how many daies dyd he worke in that 100 dayes. For to soyle this question, ye must adde togeather bothe the summes of money, that is 5 grotes and 4 grotes; commeth to 9 grotes, that is your diuisor. Now for to know how many dayes that he had wrought, saye thus: 9 gyueth me 4, what gyueth me 100, make it after the

rule of three, & ye shall finde that he had wrought 44 dayes and $\frac{4}{9}$ of a daye.

Now will ye know how manye dayes that he playeth, then saye 9 giueth 5, what giueth 100, make it after the rule & it commeth 55 dayes and $\frac{4}{9}$ of a day.

Of a Man that lay in his death bed.

Item a man that laye in his death bed called his childzen to him and sayde vnto his eldest sonne, goe to the chaunger where my money standeth, and tell him that he giue you money 1 pounde and of that ỹ remayneth yet the tenthe part. Then he saith to his second sonne go to the chaunger as your brother did and tell him that he giue you 2 pound, & of that that remaineth yet the tenth part. And to the other he said that they should doo as their brothers had done, but euer the one should bring a pound more then the other. And he sayde to

the

the yongest that he should go and fetch all the money that his brothers hath left there. And when this is doone eche Childe broughte lyke muche money home. Now I demaund how manye children were there, and how muche mony that eche child brought from the chaunger, and how muche money was at the chaungers? Wyll ye knowe this, then subtract the teller that standeth in the broken number, that is 1 from 10 rest 9, for so manye children hadde the same man. And so many poundes starlynge dyd euery chylde fetch from the chaunger. Now wil ye knowe how muche money that there was at the chaunger, then multiply 9 with 9 commeth 81 so manye poundes starlyng was at the chaungers.

¶ A goldsmith hath a peece of 15 ounces and in the same peece is 6 ounces of gold 5 ounces of syluer, and 4 ounces of copper. To thys goldsmythe cōmeth a man or a woman ỳ which wyll

haue made of thys peece a kettell of 9 ounces. Now I demaund how much golde and syluer and copper shall be in this kettell? If ye wyll soyle this questi= on, then saye 15 gyueth 9, what gyueth 5 ounces, make it after the rule of three and it commeth 3 ounces of gold and 2 part of an ounce. Will ye know how much siluer, then say: 15 gyueth 9 what gyueth 5 ounces, make it after the rule and it commeth to 3 ounces of syluer. Now will ye know how much copper, then say 15 ounces gyueth 9, what gy= ueth 4, make it after the rule and it cō= meth 2 ounces $\frac{3}{3}$ part of an ounce, & it is done.

A man hath a golden crowne of 34 styuers, and a Phillipps gylden of 25 stiuers, and a ducate of 28 stiuers, and with this money he goeth to the chaū= ger, and wyll haue for it negenmanne= kins crownes of 6 mytes. Now I de= maund how much that he shall receyue of ech for ỹ aforesayd gold, and receiue

of

of eche lyke much. For to soyle this que stion and such lyke, then make of all the great mony that he will chaũge mytes for that is the leaste coyne that he wyll haue, and cõmeth to 9072 mites, then looke howe manye mytes that all the smal pence be worth, that he will haue, that is 25. Nowe deuide the great sum of the mites, that is to wyt 9072 wyth 25, and ye shall finde that he must haue of eche 362, and $\frac{22}{25}$ and it is done.

Of 4 Carpenters.

Foure carpenters will make a house whereof the firste taketh vpon him to make it himselfe alone in a yeare. The second will make it in two yeres. The third will make it in 3 yeares. And the fourth in 4 yeares. Now I demaunde if all these 4 wrought vpon that house, in what space would they 4 make that house. Wyll ye know that? then say: the first woulde make it in one yeare, that were 12 tymes in 12 yeare. The seconde

in

in 2 yeare, that wer 9 times in 12 yere. The third in three yeare, that were 4 tymes in 12 yeare. And the fourthe in foure yeare that were three times in 12 yeare. Now summe them all together, that is 12. 6. 4. 3. commeth to 25, therewith deuide 12 cõmeth $\frac{12}{25}$ part of a yeare

Now if ye will know how many dayes that it is, then multiply 12 with 365 for so many dayes be in a yeare, and that that cõmeth of that multiplication deuide it by 25 commeth to 175 dayes $\frac{5}{25}$ part of a day.

¶ The rule of false positions, by the which all maner of difficult and hard questions may easily be dissolued, and first of one false position.

NOw shall ye know how by false positions or coniectures one or twoo ye shall fynde out the very trueth of that the whiche ye seeke for, and fyrste ye shall vnderstande howe

to fynde the trueth of a queſtion pro-
poſed by one coniecture or poſytion.
When that anye queſtion is put foorth
vnto you to be aſſoyled, of the whych
one parte is knowen and the other
vnknowen. Aunſwer to that queſtion
by and by, with your ſelfe at all aduen-
ture, and then conſider with your ſelfe
whether ye haue made right aunſwer
or no, yf not, looke what proporcion is
betweene your coniecture and that ẏ
followeth of your coniecture, and the
ſame proporcion is betweene the thing
knowen and ẏ pertaineth vnto the ſelfe
thing beyng yet vnknowen. As by ex-
ample ye ſhall more plainely perceaue.

¶ A certaine Wayfaringe man, com-
ming by the way, foũd ſo many crow-
nes, that the ſeconde, the thyrde, and
the fourth part of them added together
made 50. I demaund what ſumme he
found. To make aunſwer to thys que-
ſtion by one poſition, imagine ſome
ſumme that hath theſe parts in it, ẏ is

to

to say, a seconde, a thirde, and a fourth part: and be it 12, whose seconde part or halfe is 6, the thirde part 4, the fourth part 3, which all added together 6. 4. 3. make 13, but the summe that he found, the seconde, thirde, and the fourth of it made 50, wherfore 12 is not the summe he found, therefore this position is false and yet by thys false shall yee come to the lyghte of truth, by the helpe of the rule of three. For looke what proporcyon is between the second, the thyrde, & the fourthe parte of 12 added together, the whyche maketh 13, and 12 whose partes there be, the same proporcyon is between 50, which is the second, the third and the fourth part added together of the number vnknowen, and the same vnknowen number it selfe. Then say thus wyth thy selfe: if 13 which containeth the foresayde partes in them, come of 12, of whom come 50, then sette them thus: 13. 12. 50. then by the rule of three multiplye 50 by 12, and thereof com=

commeth 600, deuyde the same by the fyrste number 13, and in the quocient, thou shalt finde 44 2/13 the whyche was the summe of the crownes the whyche the man founde: of the whych summe the halfe part is 23 1/13 the third part is 15 1/13 the fourthe parte 11 7/13 the whych partes added togeather make iuste 50. Thus thou seest howe that by one false posicion or coniecture wyth the helpe of the rule of three, thys questyon is soone dissolued.

¶ An other question.

Finde a number in the whych 5 is 2/3 that is to say, two third partes of hime Answer. Imagine any number ye lyst, that hath thirdes in it, as be it 6, then looke what is the thyrde part of 6, that is 2, then two of this thyrde parte of 6 maketh 4, wherefore this polycyon is false, yet by this false posicion with the helpe of the rule of three, thou shalte finde

fynde out the truth, after this manner If 4 be the 2/3 partes of 6, to who is 5 2/3 partes, search by the rule of three, and thou shalt finde it 7 1/3

CAnother question.

What number is that, in the whiche after that the thirde, the fourth and the fifte parte be deducted out of it, there shall yet remayne 24? Answer. Imagin anye number that hath a thyrde, a fourth, & a fifte in him. As for example say it is 60, then subtract oute of hym his thyrd his fourth, and his fyfte part, and thou shalte fynde remayne but 13. Lo how much thou hast myssed, thou shouldest haue founde suche a number in the which after the forsayde partes were subtracted, should remayne 24, & here remaineth but 13, yet proue by the rule of three, & thou shalt finde the true number. If 13 remayne after the subtraction of the forsayde partes in 60,

what

what number is that out of the which after lykes ubtractyon of hys thyrde, fourth, and fifte partes shall remayne 24, prooue by the rule & thou shalt finde it 110 $\frac{10}{13}$ whole third part is 36 $\frac{12}{13}$ ỹ fourth 27 is $\frac{9}{13}$ the fifte 22 $\frac{2}{13}$ which al'added together make 86 $\frac{10}{13}$ the which reducted ou tof 110 $\frac{10}{13}$ shall remaine 24. These and diuers other questions before rehearsed by the same crafte one false posicion may soone be assoiled, Now will I shew you how to dissolue all manner of questions, how difficult so euer they be by two false posicions: For by one false posicion yre shall not answer to all maner of questions, but two false posicions, what soeuer question it be, it may soone haue solucion.

How to answer by two false posicions.

INnumerable questions doo chaunce in numbers, the which though they

can

can not be dissolued by one posicion or coniecture, yet shall it not mysse but be assoiled by two posicions: in the whych maner yee muste diligentlye note howe farre aboue the truth or vnder both posicions do fall. For by the obseruatyon of two coniectures how neere they bee to the trueth, and the difference of the errours which ensue of the polycyons, the veritye commeth to lyght, whyche may be doone 2 waies: one way by the rule of both moze or bothe lesse. Another waye by the rule of the one moze and the other lesse.

When both posicions be moze then the veritye or both lesse, then subducte the lesse errour out of the moze errour, and that that remaineth shalbe the deuisor, then multiply the fyrste errour by the seconde polycyon and the latter errour by the fyrst posicion, and thē these two numbers beeyng multyplyed, deduct the lesse out of the moze, and that that remayneth deuyde it by the foresayde

sayd diuisor, & the quotient shall shewe the verity. Example.

Three marchauntes deuyded a 109 crownes more then the fyrste, and the third 4 moe the the second: I demaund now how many crownes eche of them receaued: Answer. Fyrste make sayntes Androwes crosse, as yee see hereafter, then conjecture what yee lyst, as for example. Say the fyrst had 33, and then must the seconde haue 36, and the thyrd marchant 60. Which summe gathered together maketh 100, but yee had but 100 to deuyde, wherefore yee haue mysled 9, and your posycion redowneth to more then the very summe by 9, which came of your fyrst posycion 33 wherfore sette the fyrst posycion 33 at the vpper end of the crosse on the lefte syde of the crosse, and the errour whyche hath ensued of that at the foote of the crosse on the same syde, as ye see in the example. And for bycause that thys conjecture, came to more then the truth, ther-

foze sette this letter M. in the space betwene the vpper ende of the crosse and the nether. And foz as much as in this fyrste coniecture yee haue erred thus much, coniecte againe and suppose that the fyrste marchaunt had 31 then muste the seconde haue 34, the thyrde 38, all these collecte make 103, so that nowe yee haue erred againe, your posycyon beeyng to much, so that your errour is 3. and foz because that this seconde posicion is moze then the verytye as the first was: sette the posicion 31 at the vpper ende of the crosse on the righte syde. & the errour 5 the fote of the crosse on ỹ same side, & put this letter M, betwene the space to sygnyfye moze. Bothe these posicions then be moze then the veryty wherefoze according to ỹ rule first subduce the lesse errour 3 at the foote of the ryght syde of the crosse from the greater errour at the foote of the lefte syde of the same crosse, remaineth 6 to be set in ỹ space betwene both ỹ feete as ye se

which

which shalbe the dyuisor. Then accor-dyng to the rule, multyply the fyrste po-sition whych is 33 by the errour of the seconde posicion which is 3, and there-of cometh 99, then the seconde posicion 31 by the errour 9 of the fyrst polycyon, and thereof commeth 279, then deduct the lesse sum 99 out of this more sum 279, remaynth 180, deuide thys summe by the dyfference of the errours whych is the trewe polycion. For the fyrste man hauing 50, the seconde must haue 33, and thyrd 37, which all set together make iust 100. Thus wonderfull craf-tily by these .ii. false polycions the trew and iust polycion is brought to lyght.

*The example.

An example whē both posi-cyons come to lesse then the verity.

When both posycyons come to lesse then the verity: the which is all one matter wyth the other, as yee shall perceaue by the same example agayne. As suppose yee had coniected that the fyrste had receaued 27, then must the second receiue 30, and the thirde 14, whych added togeather make 91 whyche is lesse by 9 then the summe 100, which should be deuided among them. Sette then this firste false posycion 27 at the vpper ende of the crosse on the lefte syde, and the errour ensuing of that, at the foote of the same crosse on the same side. And for because that this posycyō came to lesse then the verity therefore sette this letter L. for lesse, in the space betwene the posycyon and the errour, as yee se in the example folowyng. Then conyect agayne and suppose that the fyrste marchaunt had receaued 27 then by that reckoning the

second

ſecond ſhould receaue 52 the thyrde 30 which all ſet together make 97, ſo that yet thys poſycion commeth not to the verity 100, but lacketh 3 of it, wherfore ſet this poſycyon 29 at the vpper ende of the croſſe at the right ſyde: and this errour 3 at the foote of the croſſe, and in the ſpace betweene the poſycion and the errour ſet thys letter L. for leſſe. Nowe for ſo much as both theſe poſycions be leſſe then the verytye, woorke as ye dyd before, according to the rule, ſubduce the leſſe errour 3 out of the greater errour 9, remaynyth 6 for the diuiſor to be ſette in the ſpace betweene the two errours. Then multiplye the fyrſt poſycyon 27 by the ſeconde errour 3 commeth 81, then the ſeconde conjecture 29 by the fyrſte errour 9 commeth 261 then deducte 81 out of 261 remayneth 180 which diuyded by 6 the diuiſor afore ſayd, the quotient ſhall bee 30. which is the iuſte and very conjecture, the whych yee ſhoulde haue conjected.

Thus

Thus yee haue had suffycyent example of thys fyrste rule of bothe moze, and bothe lesse.

¶ Heere after followeth the example of bothe lesse.

¶ Heere foloweth the rule of one more, and the lesse.

When the one posycyon amounteth to moze then the veretye, and the other lesse then the verity, then adde the errours togeather & that added number shall be the diuisor. Then multiply the fyrst posycyon by ỹ second errour, and the seconde posycion by the first errour, & that that cõmeth of both these multiplicatours ad them together also, then deuide thys added number by the added errours the dyuisor

uisor afore saide, and the quocient sheweth the true position.

¶ The example.

✠ We wyll take the fyrst case againe, and suppose that the fyrste marchaunt haue receaued 33 crownes, then muste the seconde receaue 35, and the thirde 39 wherefore that posycion is false and to much by 6, sette the posion 32 at the vpper ende of the crosse, and the errour 6 at the neather ende of the crosse: in the space betwen, ye shall set this letter M. for more. And for bycause that this posicion hath exceded the verytye, coniect againe lesse, and suppose that the fyrste haue receaued 20. then must the second receaue 22, the thyrd 39 all added togeather maketh 97. which is lesse then the verytye by 3, wherefore set this false posycion 29 at the vpper ende of the ryght syde of the crosse: and the errour 3 at ỹ neyther foot of the crosse: in the space betweene set thys letter L. for lesse. Of these two false posicions ỹ one is more

then

then the truth, the other is lesse, wherefore accordyng to the rule adde both the errours 6 and 3 together, that maketh 9 for the diuysor: then multiply the fyrst posicion 32 by the second errour 3 which maketh 96. and the seconde posycyon 29 by the fyrst errour 6, which maketh 174 & that that ensueth of both these multiplicatiõs ad it together, & it maketh 270 diuyde thys added number by the added errours, which was 9. & the quocient shalbe 30 whych is the true posicion as ye may proue.

¶ The example.

¶ Thus may yee dissolue all other maner of questions, which haue ben set before in this booke, without great paine or studye.

¶ FINIS.